S. Hrg. 101-377

CONSUMER OZONE PROTECTION ACT OF 1989

HEARING

BEFORE THE

SUBCOMMITTEE ON THE CONSUMER

OF THE

COMMITTEE ON COMMERCE, SCIENCE, AND TRANSPORTATION

UNITED STATES SENATE

ONE HUNDRED FIRST CONGRESS

FIRST SESSION

ON

S. 870

TO LABEL CONSUMER PRODUCTS CONTAINING SUBSTANCES THAT CONTRIBUTE TO THE DEPLETION OF THE OZONE LAYER IN THE UPPER ATMOSPHERE TO REGULATE THE SALE, DISTRIBUTION, AND USE OF SUCH SUBSTANCES IN CONSUMER PRODUCTS AND SERVICES IN AND AFFECTING INTERSTATE COMMERCE, TO RECAPTURE AND RECYCLE SUCH SUBSTANCES, AND FOR OTHER PURPOSES

OCTOBER 19, 1989

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Committee on Commerce, Science, and Transportation

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CONSUMER OZONE PROTECTION ACT OF 1989

THURSDAY, OCTOBER 19, 1989

U.S. Senate,
Committee on Commerce, Science, and Transportation,
Subcommittee on the Consumer,
Washington, DC.

The subcommittee met, pursuant to notice, at 9:40 a.m., in room SR-253, Russell Senate Office Building, Hon. Richard Bryan (chairman of the subcommittee) presiding.

Staff members assigned to this hearing: Linda Lance and Kevin Curtin, staff counsels; and Kevin Dempsey, minority staff counsel.

OPENING STATEMENT BY RICHARD BRYAN

Senator **Bryan**. Good morning, ladies and gentlemen. Today the Consumer Subcommittee will hear testimony on the need for and the effects of S. 870, the Consumer Ozone Protection Act of 1989.

As we all know, the stratospheric ozone shield is important to the existence of life on earth, since it screens out some of the sun's harmful ultraviolet rays and prevents them from reaching the earth's surface.

It is disturbing to realize that man inadvertently has apparently contributed to depletion of this valuable ozone shield with the development of certain chemicals. These chemicals, either used as refrigerants, solvents, foam blowing agents, or fire extinguishers, are often referred to as CFCs, but include not only chlorofluorocarbons, but halons and other chemicals.

In addition to their effect on the ozone shield, these chemicals are greenhouse gases, which trap heat at the earth's surface and ultimately threaten to cause unprecedented warming of the globe.

While ozone depleting chemicals contribute only about 30 to 40 percent as much to global warming as carbon dioxide, their release is increasing much faster than the release of carbon dioxide, and each molecule contributes 1,000 times as much to global warming as does each molecule of carbon dioxide.

Thus, for two important reasons, we must look at ways to control these chemicals. S. 870 would impose certain labeling and recycling requirements on consumer products that use these chemicals, and would ban certain fire extinguishers and nonessential products.

Today we will explore whether this is an appropriate means of addressing the use of these chemicals. We are fortunate to have with us some of the experts in the science of the ozone layer and the effect of ozone depleting chemicals. We hope to obtain the latest data about the Antarctic ozone and information on international efforts to control these chemicals.

We will also hear about the effect of this bill from the environmental perspective and from the perspective of the industries that use the affected chemicals.

I look forward to the testimony and to learning more about this critical issue. I am pleased this morning to recognize the principal sponsor of the bill, my friend and colleague, Senator Gore.

OPENING STATEMENT BY SENATOR GORE

Senator GORE. Mr. Chairman, thank you.

Let me begin with a personal word of thanks to you for having this hearing and to allow us to continue what must be an ongoing investigation of key aspects of what I and many others believe is the most serious environmental crisis we have ever faced.

The most recent news from Antarctica which Dr. Robert Watson, who just walked in the door, will tell us about in a moment reinforces both the sense of urgency and the unparalleled scope of these challenges.

Researchers are telling us that the chemicals we have been pouring into our atmosphere are creating a dangerous hole of shocking and unprecedented proportions in the stratospheric ozone layer above that continent. This year it could be as bad as 1987, and that year stratospheric ozone levels above Antarctica fell to record lows, nearly 50 percent of the upper ozone destroyed and a continent sized hole created.

There are many factors above Antarctica that lead to the special conditions there, the wind patterns with their centrifugal force create a kind of bowl in which that chemical brew sits until the sun's rays strike that bowl in our fall or the astral spring.

The cold temperatures which are not replicated anywhere else on earth mean that the clouds go higher into the stratosphere and form ice crystals where the chemical reaction can take place much more quickly and readily. And, therefore, at this time of the year we see the rapid disappearance of ozone in the stratosphere above Antarctica.

What is less well known is that the ozone layer above the rest of the earth is also being depleted, and the depletion is occurring more rapidly than scientists can easily explain.

There have been unwanted, unexpected surprises such as the ozone hole above Antarctica, and this is a less well known but also troubling surprise to find the rapid depletion of the ozone layer above Washington, D.C. and Tennessee and Nevada and all over the earth.

The consequences, of course, include not only additional cases of skin cancer and cataracts, but also the suppression of the human immune system, interference with photosynthesis, perhaps a catastrophic damage to small plankton at the base of the food chain in the ocean, and an effect that is not well known—when there is more ultraviolet radiation coming through a thinner stratospheric ozone layer, it creates more low level ozone or smog.

Indeed, last summer at a hearing in Los Angeles we heard from the designers of the most draconian set of emissions controls in the country, that those emissions controls will not lead to improvements in air quality if the deterioration of the stratospheric ozone layer continues because lower levels of automobile emissions in Southern California will lead to even higher levels of smog with more ultraviolet radiation coming through the thinner stratospheric ozone layer.

Now, what is responsible for all this damage? There is no mystery. We know more than enough to say with absolute certainty that human civilization is responsible, and in particular a class of chemicals, including most prominently chlorofluorocarbons and including as well methylchloroform, halons, and a few other substances are responsible for this damage. Scientific evidence is overwhelmingly clear.

It is not that we intend to poison our environment when we put these chemicals into the atmosphere. It is the kind of activities that make up an average weekend at home, fixing up the air conditioner on the car, decorating a kid's birthday hat with party streamers from a spray can, sounding a noise horn at a football game. Most of us do not even realize that we are dealing with CFCs when we are dealing with them, and most of us do not even stop to think about it.

So, that is why this legislation is so important, Mr. Chairman. As we work for international agreements to bring ever more effective limits on these chemicals and move toward the fastest possible complete phaseout here at home and overseas, we also must recognize that there are small steps we can take closer to home that will make a big difference.

A phaseout in the production of these chemicals is a long-term solution. Right now we can act and move toward these broader goals. Labeling products that have ozone-depleting chemicals among their ingredients can increase consumer awareness of these substances and their destructive ability. More importantly, ending the sale of nonessential consumer products with CFCs can prevent frivolous but still damaging emissions and taking more care to prevent emissions of CFCs when we service automobile air conditioners makes good sense. That is where a lot of the leakage takes place in the automobile air conditioners, at least in the United States.

So, this legislation will allow us to make a difference, to choose products without these chemicals or, when alternatives do not yet exist, to know that the products containing ozone-destroying chemicals must be disposed of properly in order to protect our environment.

These are steps we should take immediately to reduce the amount of these harmful chemicals that we are releasing into our environment. The warning signals of the global environmental crisis—and depletion of the ozone layer is a key warning—are compelling and clear. They are warnings of severe economic and environmental dislocation in the coming decade that will be prevented only if we move now. The phaseout of these chemicals over the long term is essential.

If someone was poisoning your children, you would not give them the option to stop only if they could find a safe substitute. Already many in the private sector have taken a leadership role in finding alternatives to ozone-depleting chemicals and reducing emissions.

Almost every week we read about another company pledging to phase out its use of ozone-depleting chemicals in the near future.

Just as these companies are recognizing their responsibility, so should we. The longer we wait to phase out these chemicals, the longer these chemicals will have to phase out the stratospheric ozone layer.

Now, Mr. Chairman, I brought a chart that EPA prepared that was very troubling to me, and I want to put it in the record. I am not going to dwell on it at this time. I want to save it as the basis for a couple of questions to our first panel. But, again, I deeply appreciate you having this hearing, and I look forward to the witnesses.

Senator BRYAN. Thank you very much, Senator Gore. We will make that chart a part of the record and look forward to some of the colloquy that will be developed as a result of the information contained therein.

We have been joined this morning by another member of our panel who served as a former chairman of this subcommittee, Senator Wendell Ford.

Senator Ford.

Senator FORD. I have no statement. I just thank you, Mr. Chairman, for your hard work in getting down to the problems that we face, and I look forward to the hearing and staying as long as I can.

Senator BRYAN. Thank you very much. We are delighted to have you join us this morning.

We have been joined by the ranking minority member of the subcommittee, Senator Gorton.

OPENING STATEMENT BY SENATOR GORTON

Senator GORTON. Mr. Chairman, thank you for scheduling this hearing on the Consumer Ozone Protection Act of 1989. Depletion of the ozone layer is a serious worldwide environmental problem that requires serious attention. The complexity of this problem is highlighted by the wide variety of uses of CFCs and halons in consumer products, including air conditioners, refrigerators, and fire extinguishers.

The legislation before us today uses a number of regulatory techniques in an attempt to protect the ozone layer from releases of CFCs and other ozone-depleting chemicals. I look forward to the testimony of our distinguished witnesses today as the subcommittee considers the impact of these proposals on both industry and the environment. I know that many in industry have been working to develop new technologies to reduce, replace, or recycle CFCs and I am interested in hearing from them about their efforts.

Finally, I would like to thank Senator Gore for bringing this legislation before our committee. He has been a leader on this important issue in both the Commerce Committee and the full Senate.

[The bill and chart referred to follow:]

101st CONGRESS
1st Session

S. 870

To label consumer products containing substances that contribute to the depletion of the ozone layer in the upper atmosphere, to regulate the sale, distribution, and use of such substances in consumer products and services in and affecting interstate commerce, to recapture and recycle such substances, and for other purposes.

IN THE SENATE OF THE UNITED STATES

May 1 (legislative day, January 3), 1989

Mr. Gore introduced the following bill; which was read twice and referred to the Committee on Commerce, Science, and Transportation

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A BILL

To label consumer products containing substances that contribute to the depletion of the ozone layer in the upper atmosphere, to regulate the sale, distribution, and use of such substances in consumer products and services in and affecting interstate commerce, to recapture and recycle such substances, and for other purposes.

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled,

SECTION 1. SHORT TITLE.

This Act may be cited as the "Consumer Ozone Protection Act of 1989".

SEC. 2. FINDINGS.

The Congress finds as follows:

(1) The United States can demonstrate to the world its commitment to conserve the ozone layer of the upper atmosphere by instituting market and regulatory strategies that—

(A) phase out certain consumer products that unnecessarily release ozone-depleting substances;

(B) immediately reduce emissions of ozone-depleting substances;

(C) encourage rapid replacement of ozone-depleting substances with safe substitutes and alternative technologies; and

(D) encourage efficient recapture and recycling of ozone-depleting substances.

(2) The highest priority must be given to developing and deploying safe alternative substances and technologies to replace ozone-depleting substances within five years.

(3) Development of alternative substances and technologies to replace ozone-depleting substances will be hastened by effective government-industry cooperation to find such alternatives, including promotion of research, development, and market incentives for such alternatives.

SEC. 3. NATIONAL GOAL.

It is the national goal under this Act to—

(1) label, regulate the servicing of, and eliminate certain consumer products that contain manmade substances with the potential for depleting ozone in the upper atmosphere; and

(2) promote development of a Chlorofluorocarbon and Halon Reclamation Plan for the purpose of encouraging the recapture and recycling of such substances.

SEC. 4. DEFINITIONS.

As used in this Act:

(1) The term "alternative technologies" means any technology that performs a service, without the use of ozone-depleting substances listed under section 10 as components of its manufacture or operation, which was previously performed by technologies that require the use of such ozone-depleting substances as components of their manufacture or operation.

(2) The term "chlorofluorocarbon recapture equipment" means equipment that has been approved for the recapture of chlorofluorocarbons from stationary air-conditioners, refrigerators, and freezers.

(3) The term "chlorofluorocarbon recycling facility" means any facility which accepts chlorofluorocarbons for the purpose of recycling them through equip-

ment that meets purity standards of the Air-Conditioning and Refrigeration Institute for the purification of chlorofluorocarbons from stationary air-conditioners, refrigerators, and freezers.

(4) The term "commerce" means—

(A) commerce between a place in a State and any place outside that State;

(B) commerce within the District of Columbia or any territory or possession of the United States; and

(C) commerce which affects commerce discribed in subparagraph (A) or (B).

(5) The term "commerce products" means consumer products offered for sale at the wholesale or retail level.

(6) The term "manufactured substance" means any organic or inorganic chemical or a particular molecular identity, or any mixture, that has been manufactured for commercial purposes.

(7) The term "mobile air-conditioner" means an air-conditioner designed for installation in a motor vehicle.

(8) The term "person" means an individual, corporation (including a government corporation), partnership, firm, joint stock company, trust, association, or

any other private entity, or any officer, employee, agent, department, or instrumentality of the Federal Government, or of any State or political subdivision thereof (including any interstate body), or of any foreign government (including any international instrumentality).

(9) The term "Secretary" means the Secretary of Commerce.

(10) The term "State" means any of the States of the United States, the District of Columbia, or any commonwealth, territory, or possession of the United States.

SEC. 5. MOBILE AIR-CONDITIONERS.

(a) Within eighteen months after the date of enactment of this Act, any person who installs, services, or repairs mobile air-conditioners shall use chlorofluorocarbon recapture equipment and shall ensure that the recaptured chlorofluorocarbons are, in a timely manner, picked up and delivered to a chlorofluorocarbon recycling facility. The States shall establish phased schedules for the acquisition of such equipment by establishments carrying out such installation, service, or repair. The schedules shall provide for early acquisition by high-volume establishments and subsequent acquisition by lower-volume establishments, and shall ensure that all such establishments have chlorofluorocarbon recapture equipment in place within eighteen months after the date of enactment of this Act.

(b) Within ninety days after the date of enactment of this Act, no person shall sell or distribute, or offer for sale or distribution, in commerce any chlorofluorocarbons suitable for use in mobile air-conditioners in containers smaller than thirty pounds, unless the container bears a warning label as specified in section 8.

(c) Within nine months after the date of enactment of this Act, no person shall sell or distribute, or offer for sale or distribution, in commerce chlorofluorocarbons suitable for use in mobile air-conditioners in containers smaller than thirty pounds. The States shall issue regulations providing for a phaseout of the sale of chlorofluorocarbons in such containers in the period within six months after the date of enactment of this Act.

(d) Within nine months after the date of enactment of this Act, no person shall recharge mobile air-conditioners with chlorofluorocarbons, without first testing the mobile air-conditioner system for leaks and repairing any leaks found in such system.

SEC. 6. FIRE EXTINGUISHERS FOR CONSUMER APPLICATIONS.

(Within nine months after the date of enactment of this Act, no person shall sell or distribute, or offer for sale or distribution, in commerce fire extinguishers that contain halons or any ozone-depleting substances listed under section 10 of this Act, except for applications required by Federal law.

SEC. 7. NONESSENTIAL CONSUMER PRODUCTS CONTAINING CHLOROFLUOROCARBONS.

Within six months after the date of enactment of this Act, no person shall sell or distribute, or offer for sale or distribution, in commerce chlorofluorocarbon-propelled plastic party streamers and noise horns, chlorofluorocarbon-containing cleaning fluids for electronic and photographic equipment, or any other consumer products which are capable of releasing into the atmosphere substances listed under section 10 of this Act and are determined by the Secretary to be nonessential.

SEC. 8. LABELING REQUIREMENT.

(a) REQUIREMENT.—Any consumer product that contains, is produced with, or is produced from a substance listed under section 10 of this Act shall be labeled in accordance with regulations issued by the Consumer Product Safety Commission under subsection (c) with the appropriate label, as follows:

(1) If the consumer product contains a substance listed under section 10: "**GOVERNMENT WARNING:** This Product Contains (insert name of listed substance), Which Destroys the Earth's Protective

Ozone Layer, and Disrupts the Earth's Climate. Destroying the Ozone layer Greatly Increases the Risk of Skin Cancer and Harms Natural Systems, Including Food Production.".

(2) If the consumer product is manufactured by a process that involves the use of a substance listed under section 10: "**GOVERNMENT WARNING:** This Product is Manufactured With (insert name of listed substance), Which Destroys the Earth's Protective Ozone layer, and Disrupts the Earth's Climate. Destroying the Ozone Layer Greatly Increases the Risk of Skin Cancer and Harms Natural Systems, Including Food Production.".

(3) If the consumer product is produced from a substance listed under section 10: "**GOVERNMENT WARNING:** This Product Is Produced From (insert name of listed substance), Which Destroys the Earth's Protective Ozone layer, and Disrupts the Earth's Climate. Destroying the Ozone layer Greatly Increases the Risk of Skin Cancer and Harms Natural Systems, Including Food Production.".

(b) PROHIBITION.—Effective nine months after the date of enactment of this Act, no person shall sell or distribute, or offer for sale or distribution, in commerce any consumer product required to be labeled under this section unless such product meets the requirements of this section and any regulations issued thereunder.

(c) REGULATIONS.—The Consumer Product Safety Commission shall issue regulations to implement subsection (a) within three months after the date of enactment of this Act. The regulations shall require the appropriate label to be prominently displayed on the consumer products subject to this section, and to be clearly visible to persons who purchase the product at retail.

(d) ENFORCEMENT.—A product that is not labeled in accordance with this section shall be considered a misbranded hazardous substance, subject to the Federal Hazardous Substances Act (15 U.S.C. 1261 et seq.), except that the penalty for failure to label shall be a fine of 20 per centum of the value of the product, a term of imprisonment of one year, or both.

SEC. 9. CHLOROFLUOROCARBON AND HALON RECLAMATION.

(a) RECLAMATION PLAN.—Within eighteen months after the date of enactment of this Act, the Secretary shall issue a Chlorofluorocarbon and Halon Reclamation Plan. The plan shall provide for the most effective way of ensuring widespread reclamation, recycling, or regulated disposal of all substances listed under section 10 of this Act, contained in more than de minimis amounts in any consumer product or other item sold in commerce. The goal of the plan shall be to minimize releases of such substances and to otherwise provide maximum environmental benefit. The Secretary shall consider at a minimum, the following:

(1) a deposit fee system, similar to those employed for bottle and can recycling in certain States, in which deposit fees would be charged on consumer products and other items containing such substances, the deposit fees would be refunded upon return for recycling or disposal of such substances or of items containing such substances, and such refundable deposit fees;

(2) the return to, and acceptance by, retail merchants or their agents for purposes of pickup and delivery of such consumer products and other items; and

((3) government-operated local or regional collection facilities or services.

(b) PROHIBITION.—Effective twelve months after the date of enactment of this Act, no person shall sell or distribute, or offer for sale or distribution, in commerce any consumer product containing any substance listed under section 10 of this Act, unless an aperture has been installed on such product that allows such substance to be removed without the release of the substance into the atmosphere.

SEC. 10. LISTING OF REGULATED SUBSTANCES.

(a) PRIORITY SUBSTANCES TO BE REGULATED.—Within sixty days after the date of enactment of this Act, the

Secretary shall publish a priority list of manufactured substances that are known or may reasonably be anticipated to cause or contribute to ozone depletion in the upper atmosphere. The initial list shall include chlorofluorocarbon-11, chlorofluorocarbon-12, chlorofluorocarbon-113, halon-1211, halon-1301, and carbon tetrachloride. At any time the Secretary may add to the priority list other manufactured substances, includig any listed under subsection (b), if concerns over protection of the upper atmosphere ozone layer dictate such action.

(b) OTHER REGULATED SUBSTANCES.—Simultaneously with publication of the priority list, the Secretary shall publish a list of other manfactured substances that, in the judgment of the Secretary, meet the criteria set forth in the first sentence of subsection (a). The list of other consumer products shall include chlorofluorocarbon-22, chlorofluorocarbon-114, chlorofluorocarbon-115, methyl chloroform, and methylene chloride. At least annaully thereafter, the Secretary shall publish a proposal to add to such list each other manufactured substance that, in the judgment of the Secretary, meets the criteria set forth in the first sentence of subsection (a). Within one hundred and eighty days after any such proposal, following an opportunity for public comment, the Secretary shall issue a rule adding each such substance to the list, unless the Secretary determines that such substance clearly does not meet the criteria set forth in the first sentence of subsection (a).

SEC. 11. FEDERAL ENFORCEMENT.

(a) COMPLIANCE ORDERS.—

(1) Whenever on the basis of any information the Secretary determines that any person has violated or is in violation of any requirement of this Act, the Secretary may issue an order assessing a civil penalty for any past or current violation, requiring compliance immediately or within a specified time period, or both, or the Secretary may commence, in the United States district court in the district in which the violation occurred, a civil action for appropriate relief, including a preliminary or permanent injunction.

(2) Any order issued pursuant to this subsection may include a suspension or revocation of any permit issued by the Secretary under this Act and shall state with reasonable specificity the nature of the violation. Any penalty assessed in the order shall not exceed $25,000 for each violation of a requirement of this Act. In assessing such a penalty the Secretary shall take into account the seriousness of the violation and any good faith efforts to comply with applicable requirements.

(b) PUBLIC HEARING.—Any order issued under this section shall become final unless, no later than thirty days after the order is served, the person or persons named therein request a public hearing. Upon such request the Secretary shall promptly conduct a public hearing. In connection with any proceeding under this section the Secretary may issue subpoenas for the attendance and testimony of witnesses and the production of relevant papers, books, and documents, and may issue rules for discovery procedures.

(c) VIOLATION OF COMPLIANCE ORDERS.—If a violator fails to take corrective action within the time specified in a compliance order, the Secretary may assess a civil penalty of not more than $25,000 for each day of continued noncompliance with the order and the Secretary may suspend or revoke any permit issued to the violator under this Act.

(d) CRIMINAL PENALTIES.—Any person who—

(1) knowingly violates section 5, 6, 7, 8, or 9; or

(2) knowingly destroys, alters, conceals, or fails to file any record, application, report, or other document required to be maintained or filed for purposes of compliance with this Act shall, upon conviction, be subject to a fine in accordance with title 18 of the United States Code for each day of a violation, or imprisonment not to exceed two years, or both. If conviction is for a violation committed after a first conviction for a

violation, the maximum applicable punishment shall be doubled with respect to both fine and imprisonment.

(e) VIOLATIONS.—Each day of violation of any requirement of this Act shall, for purposes of this section, constitute a separate violation.

SEC. 12. JUDICIAL REVIEW OF FINAL REGULATIONS AND CERTAIN PETITIONS.

Any judicial review of any final action of the Secretary pursuant to this Act shall be in accordance with sections 701 through 706 of title 5 of the United States Code, except that—

(1) a petition for review of any final action of the Secretary may be filed by any interested person in the Circuit Court of Appeals of the United States for the Federal judicial district in which such person resides or transacts business, and such petition shall be filed within the ninety-day period beginning on the date of such final action or after such period if such petition is for review based solely on gounds arising after such period;

(2) action of the Secretary with respect to which review could have been obtained under this subsection shall not be subject to judicial review in civil or criminal proceedings for enforcement; and

(3) if a party seeking review under this Act applies to the court for leave to adduce additional evidence, and shows to the satisfaction of the court that the information is material and that there were reasonable grounds for the failure to adduce such evidence in the proceeding before the Secretary, the court may order such additional evidence (and evidence in rebuttal thereof) to be taken before the Secretary, and to be adduced upon the hearing in such manner and upon such terms and conditions as the court may deem proper and the Secretary may modify administrative findings as to the facts, or make new findings by reason of the additional evidence presented.

SEC. 13. CITIZEN SUITS.

(a) IN GENERAL.—Except as provided in subsection (b) or (c) of this section, any person may commence a civil action on his own behalf—

(1) against any person (including the United States and any other governmental instrumentality or agency, to the extent permitted by the eleventh amendment to the Constitution) who is alleged to be in violation of any permit, regulation, condition, requirement, prohibition, or order which has become effective pursuant to this Act; or

(2) against the Secretary where there is alleged a failure of the Secretary to perform any act or duty under this act which is not discretionary with the Secretary.

Any action under paragraph (1) of this subsection shall be brought in the United States district court of the district in which the alleged violation occurred. Any action brought under paragraph (2) of this subsection may be brought in the United States district court for the district in which the alleged violation occurred or the District Court of the District of Columbia. The district court shall have jurisdiction, without regard to the amount in controversy or the citizenship of the parties, to enforce the permit, regulation, condition, requirement, prohibition, or order, referred to in paragraph (1), to order such person to take such other action as may be necessary, or both, or to order the Secretary to perform the act or duty referred to in paragraph (2), as the case may be, and to apply any appropriate civil penalties under section 11.

(b) ACTIONS PROHIBITED.—No action may be commenced under subsection (a)(1) of this section—

(1) prior to sixty days after the plaintiff has given notice of the violation to—

(A) the Secretary; and

(B) to any alleged violator of such permit, regulation, condition, requirement, prohibition, or order; or

(2) if the Secretary has commenced and is diligently prosecuting a civil or criminal action in a court of the United States to require a compliance with such permit, regulation, condition, requirement, prohibition, or order.

In any action under subsection (a)(1), any person may intervene as a matter of right. Any action respecting a violation under this act may be brought under this section only in the judicial district in whch such alleged violation occurs.

(c) NOTICE.—No action may be commenced under subsection (a)(2) of this section prior to sixty days after the plaintiff has given notice to the Secretary that he will commence such action. Notice under this subsection shall be given in such manner as the Secretary shall prescribe by regulation.

(d) INTERVENTION.—In any action under this section the Secretary, if not a party, may intervene as a matter of right.

(e) COSTS.—The court, in issuing any final order in any action brought pursuant to this section or section 12, may award costs of litigation (including reasonable attorney and expert witness fees) to the prevailing or substantially prevailing party, whenever the court determines such an award is appropriate. The court may, if a temporary restraining order or preliminary injunction is sought, require the filing of a bond or equivalent security in accordance with Federal Rules of Civil Procedure.

(f) OTHER RIGHTS PRESERVED.—Nothing in this section shall restrict any right which any person (or class of persons) may have under any statute or common law to seek enforcement of any standard or requirement or to seek any other relief (including relief against the Secretary).

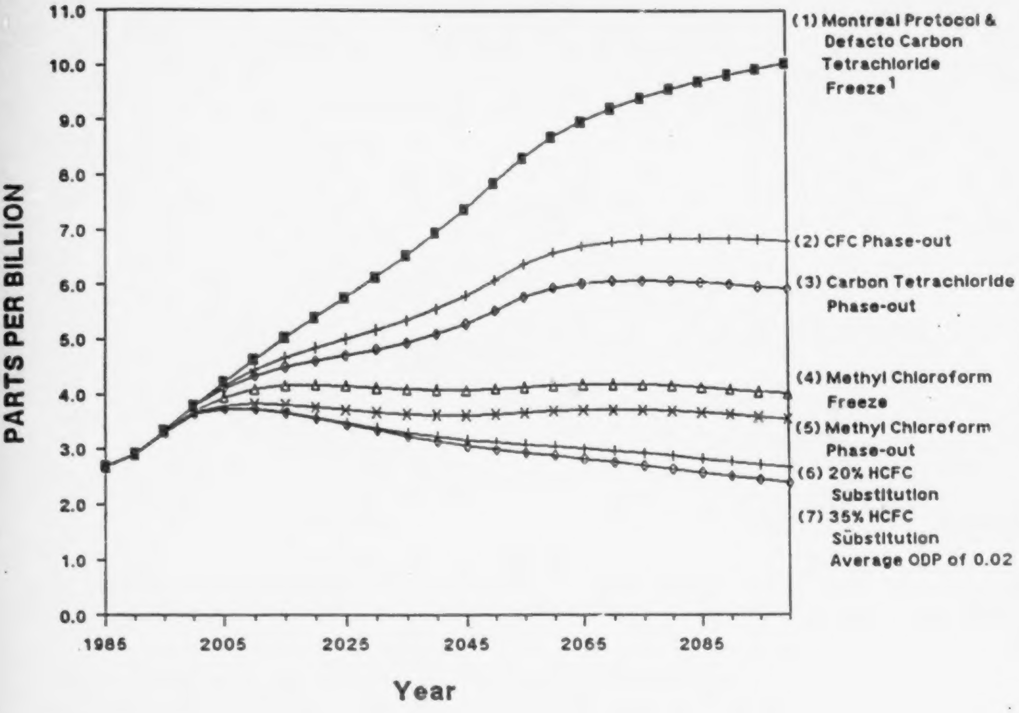
SEC. 14. SEPARABILITY.

If any provision of this Act, or the application of any provision of this Act to any person or circumstance, is held invalid, the application of such provision to other persons or circumstances, and the remainder of this Act, shall not be affected thereby.

SEC. 15. AUTHORITY OF SECRETARY.

The Secretary is authorized to prescribe such regulations as are necessary to carry out this Act.

SUMMARY REDUCTIONS - POLICIES NEEDED TO REDUCE CHLORINE CONCENTRATIONS
TOTAL Clx CONCENTRATIONS
1985 Through 2100



Assumptions:

- HCFCs Capture 60% of What CFC Market Would Have Been (Except Curves 6 and 7)
- 100% Global Participation

Notes:

[1] In earlier drafts, (including EPA's presentation in Helsinki to Montreal Protocol parties (1989)), these policies (Montreal Protocol and Carbon Tetrachloride Freeze) were shown as two separate controls. In this analysis, the two are combined based on the assumption that CFC producers will not "dump" carbon tetrachloride feedstock (that would have been used to produce CFCs) on global markets and that independent carbon tetrachloride use will not in fact increase. While possibilities exist for an increase in use to occur, such growth is unlikely given the awareness of carbon tetrachloride's potential contribution to stratospheric ozone depletion.

Senator **Bryan**. Our first panel this morning consists of Dr. Robert Watson, Chief, Upper Atmosphere, Research, Tropospheric Chemistry Branch, National Aeronautics and Space Administration, Dr. Irving Mintzer, Director of Policy Research, Center for Global Change, University of Maryland, Ms. Liz Cook, Ozone Depletion Directors, Friends of the Earth, Mr. Arthur G. Hobbs, Jr., Vice President, Mobile Air Conditions Society.

We are going to ask each member of the panel if he or she will please confine their testimony to five minutes in the interests of allowing time for the panel to ask questions. We are going to try to impose upon ourselves the same type of restriction of five minutes for questions. I know that at least one of you has indicated that you must catch a plane by 10:30, and we appreciate the tight schedule you are under. We will begin with Dr. Robert Watson. Good morning, Dr. Watson.

STATEMENT OF DR. ROBERT WATSON, CHIEF, UPPER ATMOSPHERE, RESEARCH, TROPOSPHERIC CHEMISTRY BRANCH, NATIONAL AERONAUTICS AND SPACE ADMINISTRATION

Dr. **Watson**. Thank you, Mr. Chairman, members of the subcommittee. As usual, it is a pleasure to be invited up here to discuss the important issue of ozone depletion.

What I will do this morning is summarize the key findings and the latest international scientific assessment that was performed under the auspices of WMO and UNEP that Dr. Daniel Albritton from NOAA and myself co-chaired. I will then comment on the latest status of the ozone hole over Antarctica and then finish with the results of some calculations that myself and Dr. Prather from the Goddard Institute of Space Science performed.

I think it is quite simple and, in fact, Senator Gore has quite eloquently already summarized the key scientific findings. The scientific evidence now points out conclusively that due to the special meteorological conditions and the presence of manmade chlorine and bromine-containing compounds, the ozone hole over Antarctica that reoccurs each springtime is caused by these manmade chemicals. There is absolutely no doubt in our minds.

Some people became complacent last year when the depth of the ozone hole was relatively shallow. One should note that even last year the hole was 30 or so percent lower than in 1979, and in 1979 it was already lower than it had been in 1970.

This year the ozone hole is almost identical to that in 1987. Between middle of August and literally last week the ozone levels had decreased by more than 40 percent. It was being decreased about 1.5 percent per day due to the chlorine and bromine-containing compounds.

The key question this year is: Will the hole last as long as it did in 1987 when it lasted until late November-early December? That is the early to midsummer period in the Antarctic region and, therefore, we would have to worry quite seriously about environmental damage to the aquatic ecosystems that are very rich in and around Antarctica.

So, indeed, the ozone hole is extremely deep this year, equal to the record setting level of 1987.

We are equally concerned about what is happening over the Arctic. We had a campaign earlier this year in January and February, and we found the same disturbed chemistry over the Arctic as we found over the Antarctic. That is to say, most of the chlorine had been converted on the ice crystals into a form of chlorine that can destroy stratospheric ozone.

Luckily for us nature is protecting us in the Arctic so far. That is to say, the isolated air mass with the high levels of ClO dispersed before the onset of sunlight in the springtime in the March-April time period. However, if the meteorology would have a subtle change, that is to say the isolated air mass were to last longer over the Arctic, it is quite conceivable that an ozone hole over the Arctic could occur. The likelihood of that occurring—and the possibility if that were to occur, to have these unique meteorological conditions—as we put more and more chlorine and bromine into the atmosphere, it means the depth of such a hole would get deeper and deeper.

The other evidence we have of something very disturbing is a long-term decrease of ozone over the northern hemisphere since 1970. Between 3 and 6 percent of the ozone has disappeared in the winter months that cannot be attributed to any known natural variability. We cannot prove it is due to CFCs, but it is quite likely.

What is even more disturbing is that decrease of ozone in the northern hemisphere in winter is about three times what we would have predicted due to the CFCs. The clear question is: Have we underestimated the impact of the CFCs by a factor of three or so in the northern hemisphere in wintertime possibly due to the presence of the ice crystals?

We do recognize that many of our models fundamentally have limitations. The biggest limitation is they do not describe what we have observed in the wintertime in the northern hemisphere. That leads us to be quite concerned that they may well be large-scale ozone depletions that the models are not predicting accurately.

Now, what are the implications for this? When the Montreal protocol was first signed in 1987 it was based on the theory that chlorine and bromine destroyed ozone. Today we have conclusive proof that bromine and chlorine-containing compounds are destroying ozone, definitely in Antarctica and most likely in the winter period in the northern hemisphere.

If we were to implement the Montreal protocol with 100 percent compliance worldwide, the chlorine levels of today, about three parts per billion, would at least triple to nine parts per billion by about the year 2050.

Senator **Gore**. If I could interject, Bob, you did not see the chart when you came, and we have not gotten to it, but if you are covering those figures, I just want to direct the attention to it because it goes from three to nine. I am sorry, go ahead.

Dr. **Watson**. Yes, it at least triples due to the use of CFCs, carbon tetrachloride, and methylchloroform. Clearly, if the amount of chlorine in the atmosphere were to increase, the Antarctic ozone hole would not decrease and the further we rise (about three parts per billion) the higher the probability of serious ozone depletion globally and specifically in the Arctic.

In fact, if the chlorine levels reach nine parts per billion, we would predict you could have up to a 4 percent decrease in the tropics and up to a 12 percent decrease at high latitudes, excluding the special conditions of the very high latitudes where the ice crystals are.

So, over most high latitude regions, the depletion could be as much as 12 percent, obviously quite serious.

We also are concerned that we are missing some of these ice crystal-type chemical reactions that might occur globally. That is to say if there was a major volcanic action and you would put sulfuric acid droplets into the atmosphere, it is conceivable after a volcanic eruption such as El Chichon, there could be large-scale ozone depletion worldwide by those same reactions occurring on the sulfur aerosols.

Now, what does it take to protect the ozone layer? You have to reduce the amount of chlorine in the earth's atmosphere back to the levels of the early 1970s. That is 1.5 to 2 parts per billion if we want to have any hope of the ozone hole disappearing. This would require a complete phaseout of all fully halogenated CFCs and halons and carbon tetrachloride and methylchloroform. In other words, we need a much stronger Montreal protocol than we currently have. Even a small noncompliance throughout the world would mean we may never get rid of the ozone hole over Antarctica. Even 10 percent noncompliance. Therefore, it is absolutely essential that the regulations are worldwide and they are extremely stringent. So, to recap, we must completely eliminate all the fully halogenated CFCs and carbon tetrachloride and methylchloroform.

As far as the substitutes being proposed are concerned, at the moment they look to be environmentally acceptable and the early toxicological tests look good. However, I must point out that we have not done all the needed laboratory tests to give a green light to the HCFCs and the HFCs that are being proposed by industry. We are saying they are possibly and probably environmentally safe by analogy with similar chemicals, hydrocarbons. However, until we have done those studies in the laboratory, which will take two to three years, we cannot say today that the HCFCs that are being proposed will not have some adverse environmental effects themselves.

Even if there is substitution for the current CFCs by HCFCs, that substitution cannot take place forever. If it does, even the low Ozone Depleting Potentials (ODPs) of .02 or .05 would mean you would still add enough chlorine to the atmosphere that you would stay above two parts per billion forever, and you would not get rid of the Antarctic ozone hole.

So, if one does indeed have substitution of today's CFCs by HCFCs, they themselves must be terminated sometime in the middle of the next century and my testimony gives a series of figures showing the time scale you would have to phase out even the substitutes. Thank you, Mr. Chairman.

[The statement follows:]

STATEMENT OF DR. ROBERT T. WATSON, CHIEF, UPPER ATMOSPHERE/RESEARCH/TROPOSPHERIC CHEMISTRY BRANCH, NASA

Mr. Chairman and Members of the Subcommittee:

I am pleased to be here today to discuss the current status of knowledge concerning the physical and chemical processes that control the distribution of atmospheric ozone, with emphasis on the impact of human activities, i.e, the effect of chlorofluorocarbons and halons. My testimony covers, (i) the key findings of the latest international scientific assessment of ozone that was conducted under the auspices of the United Nations Environment Program (UNEP) and the World Meteorological Organization (WMO) and co-chaired by myself and Daniel Albritton of the National Oceanic and Atmospheric Administration (NOAA); (2) the magnitude of the Antarctic ozone hole this year; and (3) the impact of hydrochlorofluorocarbon (HCFC) substitutes on atmospheric ozone. The latest international scientific assessment of ozone provides the scientific basis for the renegotiation of the regulatory measures of the Montreal Protocol.

(1) Key findings from the Scientific Assessment of Stratospheric Ozone: 1989

The scientific assessment built upon earlier scientific assessments, particularly: (i) "Atmospheric Ozone1985: Assessment of our Understanding of the Processes Controlling its Present Distribution and Change", and (ii) "International Ozone Trends Report: 1988. The scientific assessment of stratospheric ozone, entitled "Scientific Assessment of Stratospheric Ozone: 1989" comprised of an executive summary for policy makers, and four chapters written for scientists, each with a summary, (i) Polar Ozone, (ii) Global Trends, (iii) Model Predictions, and (iv) Halocarbon Ozone Depleting and Global Warming Potentials.

An evaluation of the environmental acceptability of HCFC and hydrofluorocarbon (HFC) substitutes was attached to the assessment as an appendix, "Alternative Fluorocarbon Environmental Acceptability Study (AFEAS)". The AFEAS study evaluated the potential of HCFCs and HFCs to affect stratospheric ozone, tropospheric ozone, acid precipitation and to contribute to global warming. The atmospheric degradation mechanisms of these compounds were studied, and the potential environmental effects of the decomposition products evaluated.

The recent findings and implications listed below are a synopsis of the major conclusions of the Ozone Scientific Assessment Panel. The basis for these findings and implications, including the associated uncertainties, are discussed in more detail in the executive summary (attached to this testimony as an appendix), the chapter summaries and the full report. The executive summary and the chapter summaries have been finalized and distributed by UNEP to governments. The full report will be available within a few months.

Recent Findings

Remarkable progress has been made in stratospheric ozone science in the past few years. There have been highly significant advances in the understanding of the impact of human activities on the Earth's protective ozone layer. Since the Montreal Protocol was signed there have been four major findings that each heighten the concern that chlorine- and bromine-containing chemicals can lead to a significant depletion of stratospheric ozone:

- Antarctic Ozone Hole: The weight of scientific evidence strongly indicates that a combination of unique meteorological conditions and chlorinated (largely man-made) and brominated chemicals are primarily responsible for the recently discovered substantial decreases of stratospheric ozone over Antarctica in springtime.

- Perturbed Arctic Chemistry: While at present there is no measurable ozone loss over the Arctic comparable to that over the Antarctic, the same potentially ozone-destroying processes have been identified in the Arctic stratosphere. The degree of any future ozone depletion will likely depend on the particular meteorology of each Arctic winter and future atmospheric levels of chlorine and bromine.

- Long-Term Ozone Decreases: The analysis of the total-column ozone data from ground-based Dobson instruments show measurable downward trends from 1969 to 1988 of 3 to 5% (i.e., 1.8 - 2.7% per decade) in the northern hemisphere (30 and 64°N latitudes) in the winter months that cannot be attributed to known natural processes.

- Model Limitations: These findings have led to the recognition of major gaps in theoretical models used for assessment studies. Assessment models do not simulate adequately polar stratospheric cloud (PSC) chemistry or polar meteorology. The impact of these shortcomings for the prediction of ozone layer depletion at lower latitudes is uncertain.

These and other findings are based upon the results from several major ground-based and aircraft field campaigns in the polar regions, a reanalysis of ground-based ozone data from the past thirty one years, a reanalysis of satellite ozone and PSC data, laboratory studies of gas-phase and surface-induced chemical processes, and model simulations incorporating these new laboratory data and observations.

Other Important Scientific Findings:

- Values of the Ozone Depleting Potentials (ODP) and halocarbon Global Warming Potentials (GWP) were calculated for the CFCs and halons currently included in the Montreal Protocol, carbon tetrachloride (CCl_4), methyl chloroform (CH_3CCl_3), and potential HCFC and hydrofluorocarbon (HFC) substitutes. In general, the ODPs and GWPs of the potential substitutes are significantly lower than those of the controlled substances because of their shorter atmospheric residence times.

- While the initial evaluation suggests that the proposed HCFC and HFC substitutes (HCFC-22, HCFC-123, HCFC-124, HCFC-141b, HCFC-142b, HFC-134a, HFC-152a) are much more environmentally acceptable than the CFCs, additional research is needed. The degradation mechanisms of these compounds have only been deduced by analogy with hydrocarbons having a similar chemical structure and have not been studied directly. Consequently, it is essential to directly study the degradation mechanisms of these compounds, and the environmental characteristics of the degradation products, before their environmental acceptability can be fully evaluated.

Implications

The findings and conclusions from the intensive and extensive ozone research over the past few years have several major implications as input to public policy regarding restrictions on man-made substances that lead to stratospheric ozone depletion:

- The scientific basis for the 1987 Montreal Protocol on Substances that Deplete the Ozone Layer was the theoretical prediction that, should CFC and halon abundances continue to grow for the next few decades, there would eventually be substantial ozone layer depletion. *The research of the last few years has demonstrated that actual ozone loss due to man-made chlorine (i.e., CFC's) and bromine has already occurred, i.e., the Antarctic ozone hole.*

- Even if the control measures of the Montreal Protocol were to be implemented by all nations, today's atmospheric abundance of chlorine (about 3 ppbv) will at least double to triple during the next century. *Assuming that the atmospheric abundance of chlorine reaches about 9 ppbv by about 2060, ozone depletions of 0 - 4% in the tropics and 4 - 12% at high latitudes would be predicted, even without including the effects of heterogeneous chemical processes known to occur in polar regions.*

- The heterogeneous, PSC-induced chemical reactions that cause the ozone depletion in Antarctica and that also occur in the Arctic represent additional ozone-depleting processes that were not included in the stratospheric ozone assessment models which were used to guide the Montreal Protocol. Recent laboratory studies suggest that similar reactions involving chlorine compounds may occur on sulfate particles present at lower latitudes, which could be particularly important immediately after a volcanic eruption. *Hence, future global ozone layer depletions could well be larger than originally predicted.*

- Large-scale ozone depletions in Antarctica appeared to have started in the late 1970's and were initiated by atmospheric chlorine abundance of about 1.5 - 2 ppbv, compared to today's level of about 3 ppbv. *To return the Antarctic ozone layer to levels approaching its natural state, and hence to avoid the possible ozone dilution effect that the Antarctic ozone hole could have at other latitudes, one of a limited number of approaches to reduce the atmospheric abundance of chlorine and bromine is a complete phase out of all fully halogenated CFCs, halons, carbon tetrachloride, and methyl chloroform, as well as careful considerations of the HCFC substitutes. Otherwise, the Antarctic ozone "hole" is expected to reoccur seasonally, provided the present meteorological conditions continue.*

(2) The Antarctic Ozone Hole 1989: Latest findings

Observations of total column ozone by the Total Ozone Mapping Spectrometer (TOMS) aboard the Nimbus 7 satellite have shown that the ozone hole over Antarctica this year equalled the record setting-setting hole observed in 1987. Dr's A. Krueger, R. Stolarski, and M. Schoeberl of NASA's Goddard Space Flight Center have been closely studying the situtaion. Through the first week of October the ozone hole was nearly identical to hole recorded in 1987. By October 5, the minimum value of ozone within the ozone hole had decreased by approximately 45% from early August, at a rate of about 1.5% per day. Figure 1 shows the TOMS minimum value of ozone, and figure 2 shows the TOMS mean value of ozone, between 50 degrees south and the the south pole for 1987 and 1989.

The Antarctic polar vortex was extremely cold and unperturbed (meteorologically) during August and September of this year providing the ideal conditions required for formation of polar stratospheric clouds (condensed forms of ice-crystals) that initiate the rapid chemical destruction of ozone by chlorine and bromine containing chemicals.

The situation this year contrasts to that last year when the ozone hole was relatively shallow: ozone only dropped about 15% during the month of September because the meteorological conditions were less favorable for the formation of polar stratospheric clouds.

One key question regarding Antarctic ozone in 1989 remains, i.e., will the ozone levels over Antarctica remain low as they did in 1987 until late November / early December?

The observations this year confirm that spring-time ozone over Antarctica is highly perturbed. While the depth of the ozone hole varies from year to year due to meteorological conditions, current scientific understanding indicates that the ozone hole will continue to return each spring-time until the atmospheric abundance of chlorine is reduced to the levels of the early 1970s, i.e., 1.5 to 2.0 ppbv.

(3) Impact of HCFC Substitution on Atmospheric Chlorine Loading

There are several possible approaches to further protect atmospheric ozone including:
(i) minimize peak chlorine and bromine loading to limit global ozone depletion and the possibility of significant ozone depletion over the Arctic,
(ii) reduce the atmospheric abundance of chlorine as rapidly as possible, and
(iii) reduce the atmospheric abundance of chlorine to below 2 ppbv, and stabilize the atmospheric abundance of bromine, as quickly as possible to eliminate the Antarctic ozone hole.

A number of theoretical calculations have been performed by Dr M. Prather of the Goddard Institute of Space Sciences and myself to test the impact of HCFC Substitution for CFCs, carbon tetrachloride, methylchloroform, and HCFC-22 on atmospheric chlorine loading. The following discussion highlights the results from these calculations.

Figure 3 shows the impact of the timing of a phase-out (100% cut) in CFCs, carbon tetrachloride, methylchloroform, and HCFC-22 on atmospheric chlorine abundances. Clearly both peak chlorine loading and the date at which the atmospheric chlorine abundance reaches 2 ppbv are affected. Each 5 year delay in the total phase-out of these chemicals results in the peak chlorine loading increasing by about 0.5ppbv and a 18 year delay in the date at which the atmospheric abundance of chlorine drops below 2 ppbv. From these calculations it appears that a complete elimination of the emissions of these gases (with no substitution) by the year 2000 would result in the atmospheric abundance of chlorine droping below 2 ppbv by the year 2075.

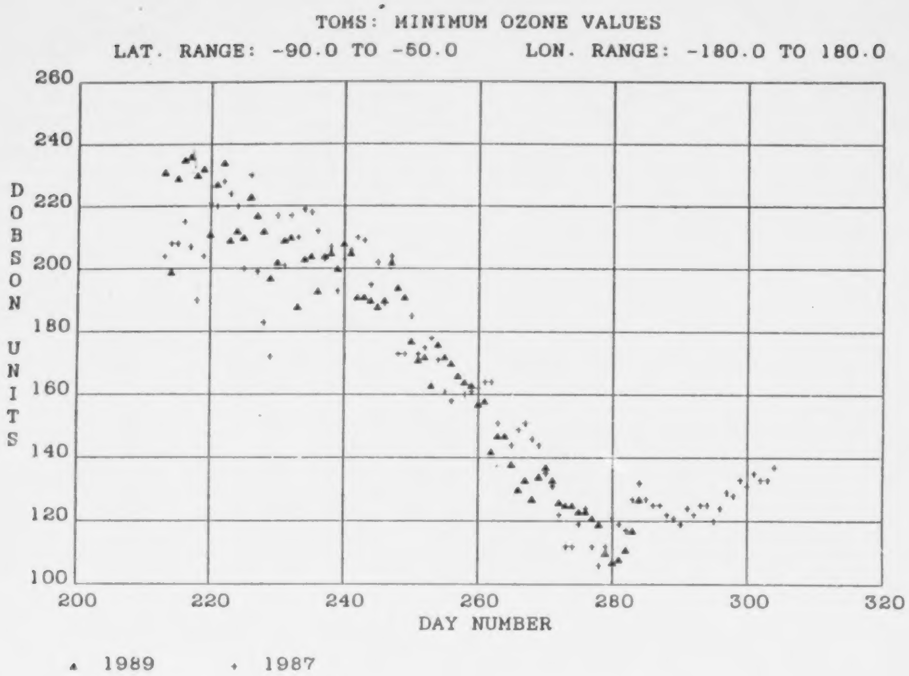
Figure 4 shows the impact of an incomplete phase-out of CFCs, carbon tetrachloride, methylchloroform, and HCFC-22 on atmospheric chlorine abundances. While peak chlorine loading is not impacted by partial phase-outs of 80% and 90%, the rate of decrease in the abundance of atmospheric chlorine and its steady state value are significantly impacted. Clearly, the atmospheric abundance of chlorine never drops below 2 ppbv unless the phase-out of these chemicals exceeds about 90%, hence no recovery of the ozone hole in Antarctica. The time taken for atmospheric chlorine to drop below 2 ppbv increases by about 100 years with a 90% phase-out instead of a 100% phase-out.

Figures 5-8 show the impact of different substitution scenarios, i.e., replacement of CFCs, carbon tetrachloride, methylchloroform, and HCFC-22 with either compound X (an HCFC with an ODP of 0.1 and a 15 year lifetime) or compound Y (an HCFC with an ODP of 0.04 and a lifetime of 6 years). The key conclusions to be drawn from these scenarios are that substitution of CFCs, carbon tetrachloride, methylchloroform, and HCFC-22 as a group between the years 2000 and 2030 by compound X, and between the years 2000 and 2045 by compound Y, would have little influence on the date when the atmospheric abundance of chlorine can be expected to fall below 2ppbv. The chlorine loading of the atmosphere beyond the year 2075 is governed by the CFCs and carbon tetrachloride emitted prior to their complete phase-out and is not affected by a limited period of production and emission of short lived substitutes. Substitution for an extended period of time, i.e., until the year 2100, would affect the chlorine loading of the atmosphere beyond the year 2075 and hence the recovery of the Antarctic ozone hole. Furthermore, peak chlorine loading is not affected by substitution (for the scenarios considered here), and a rapid decrease in peak chlorine loading can be achieved if substitution rates close to 25% for X or 50% for Y are used.

Figure 9 shows the impact of continued use of methylchloroform until the year 2030 instead of a phase-out in the year 2000. There is no increase in peak chlorine loading and little change in the date at which the atmospheric abundance of chlorine drops below 2ppbv. However, a phase-out of methylchloroform in the year 2000 does result in a relatively rapid decrease, by as much as 0.5ppbv, in atmospheric chlorine.

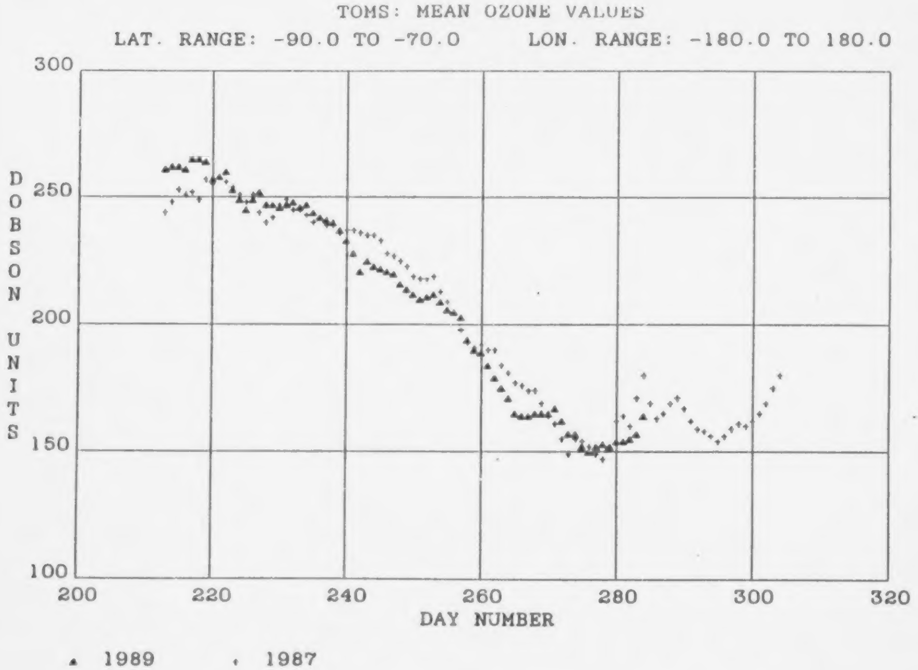
Figure 10 shows the impact of various halon scenarios on the atmospheric abundance of bromine. Continued emissions of halons 1301 and 1211 at their estimated 1990 production levels would result in an increase in atmospheric bromine from the halons from 3 pptv in 1985 to about 38 pptv by the year 2100. It is currently estimated that atmospheric bromine is 10 to 50 times more efficient in destroying ozone than atmospheric chlorine. Hence, an increase of 35 pptv of atmospheric bromine is equivalent to an increase of 0.35 to 1.75 ppbv of atmospheric chlorine.

In summary: to return the ozone layer to its natural state, i.e., pre-Antarctic ozone hole, in a timely manner would require:
(i) a phase-out in the production and emission of long-lived halocarbons (CFCs and carbon tetrachloride) as soon as possible,
(ii) 100% compliance,
(iii) reduction in the production and emission of methylchloroform,
(iv) elimination of the emissions of all chlorine and bromine containing chemicals (including the HCFCs) sometime in the middle of the next century, and
(v) stabilization of atmospheric bromine at today's levels or below.



MINIMUM ANTARCTIC OZONE AUG - OCT 11

FIGURE 1



AVERAGE OZONE 70 - 90 S

Figure 2

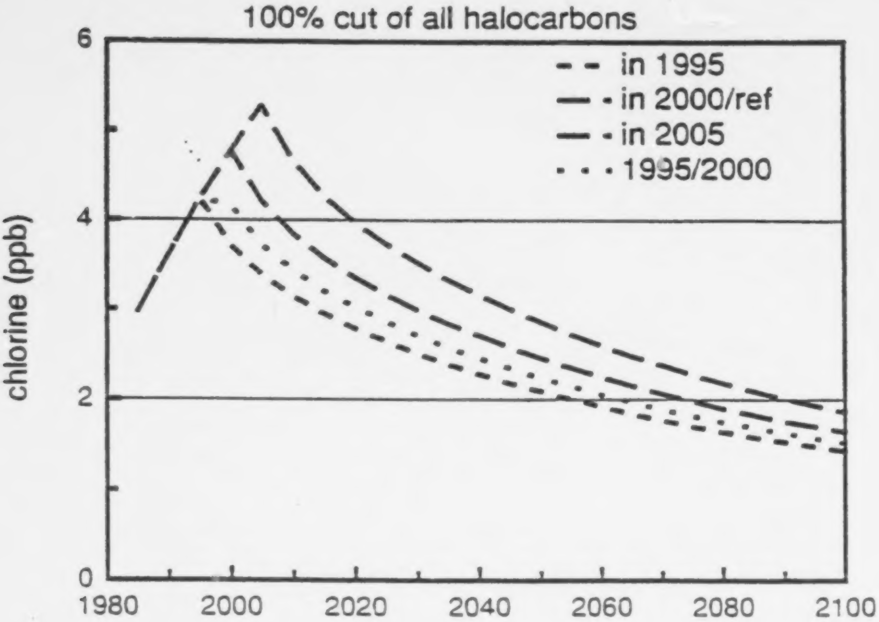

100% cut of all halocarbons

Figure 3

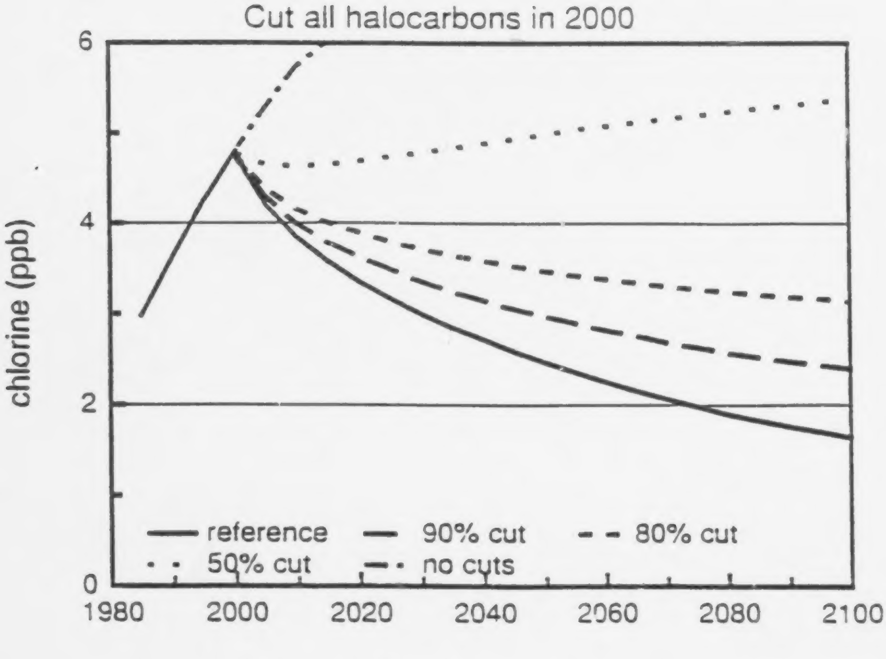

Cut all halocarbons in 2000

Figure 4

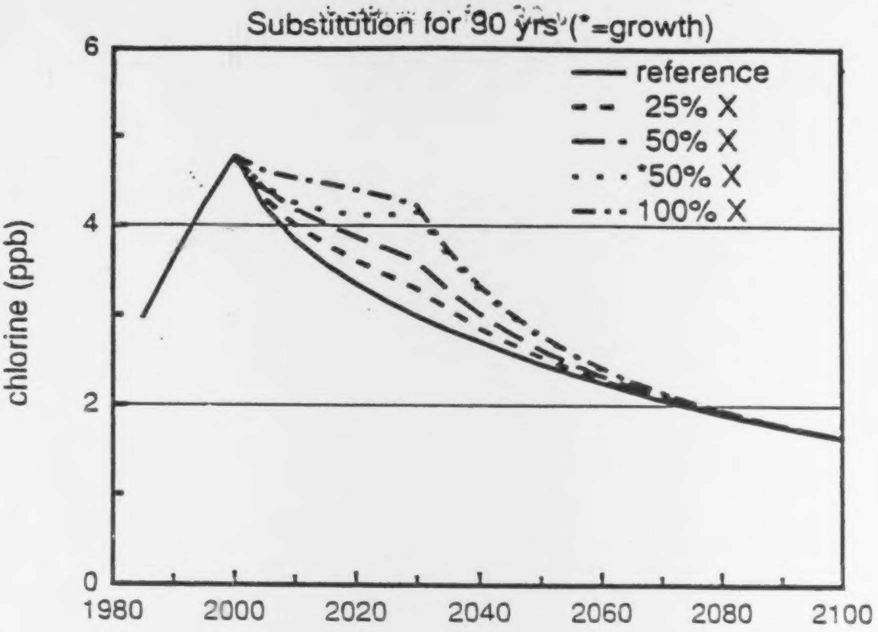


Figure 5

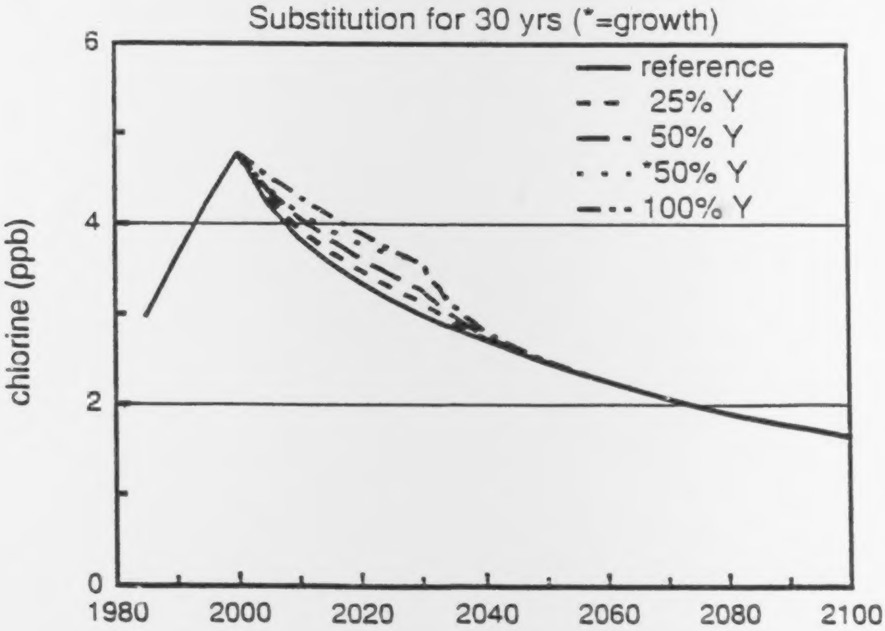


Figure 6

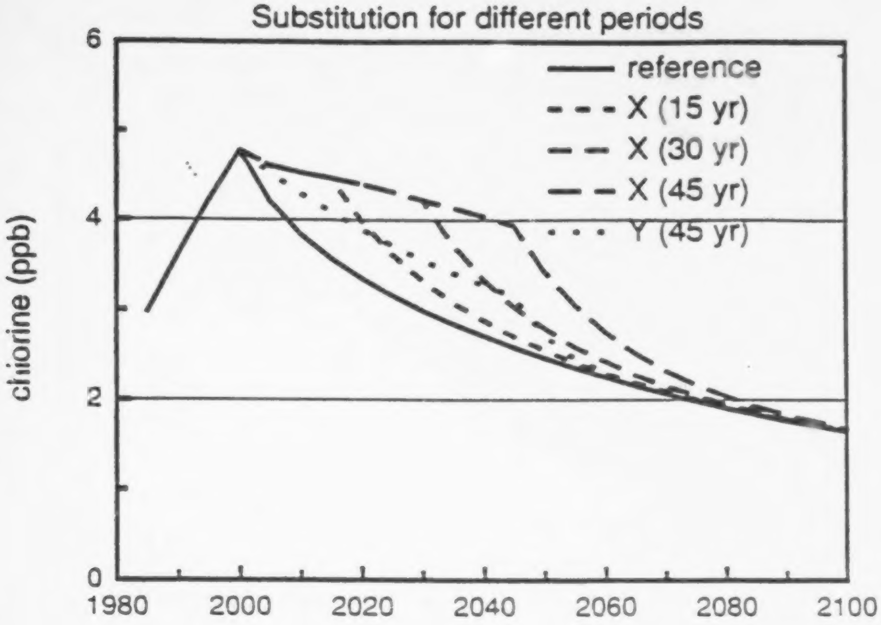


Figure 7

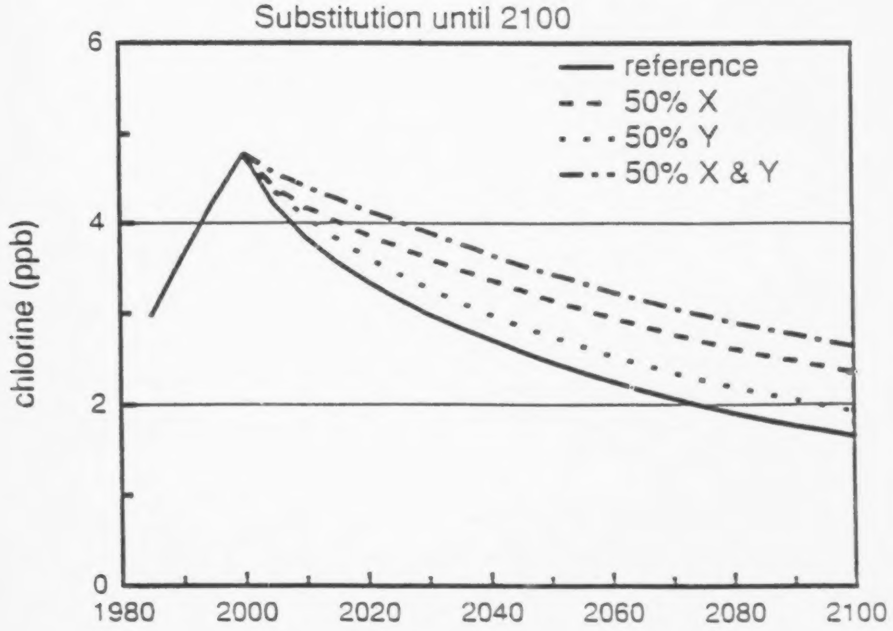


Figure 8

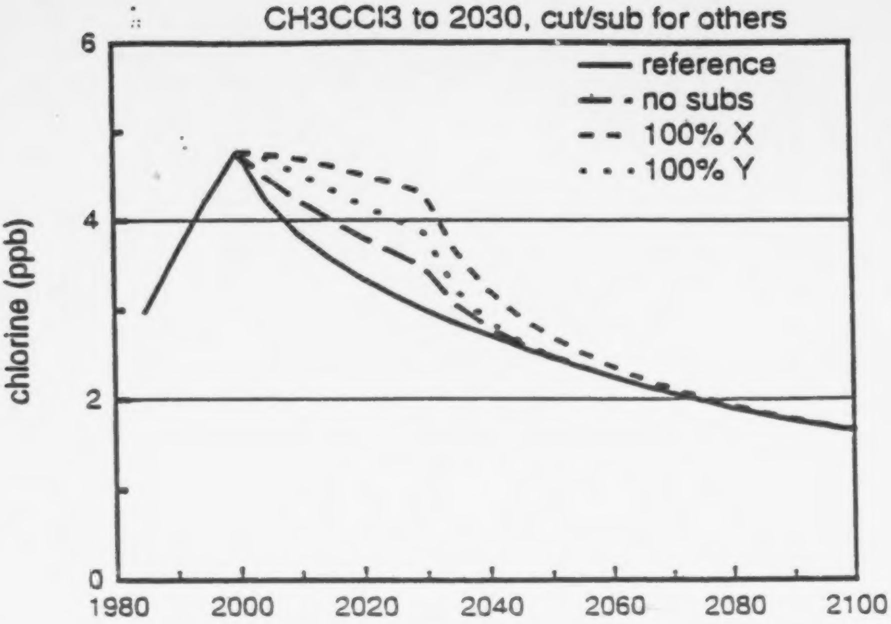


Figure 9

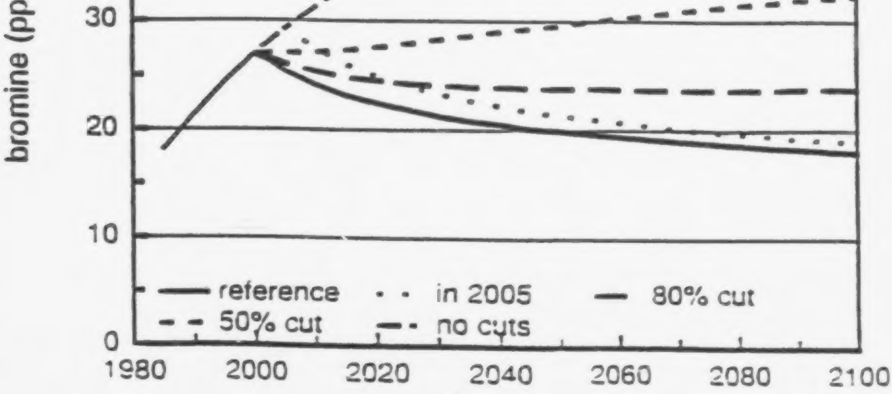


Figure 10

Senator Bryan. Thank you very much.

We will hear now from Dr. Mintzer.

STATEMENT OF DR. IRVING MINTZER, DIRECTOR OF POLICY RESEARCH, CENTER FOR GLOBAL CHANGE, UNIVERSITY OF MARYLAND, COLLEGE PARK, MD

Dr. Mintzer. Thank you, Mr. Chairman and Members of the committee. It is an honor and a privilege for me to have a chance to testify before you today on an issue of such pressing and urgent concern.

We stand today at a historical juncture, a point at which we can make policy decisions which will preserve the prospects for economic growth but minimize the long-term environmental damages both to the ozone layer and to our climate, or we can continue to muddle along, to choose policies that ignore these large potential risks, and to put at risk both the stability of our civilization and the prospects for our own and our allies' economic growth.

I am the Director of Policy Research at the Center for Global Change at the University of Maryland. I have been involved in the last six years in the international and domestic debate on ozone depletion and on global climate change. I sat as a member of the Scientific Advisory Board of EPA and of the Economic and Technical Assessment Panel at UNEP reviewing the CFC alternatives.

I want to tell you today that I think that S. 870, the Consumer Ozone Protection Act of 1989, is a good and important bill. If passed into law, it will have several salutary effects. It will enhance American prestige abroad and strengthen our ability to persuade both other industrial countries and our neighbors in the developing world of the importance of acting directly and aggressively to reduce the risk of ozone completion.

It will also improve the economic efficiency and functioning of our domestic markets by providing information directly to consumers that allows them to make informed and educated choices about the products they buy. It will reduce barriers to market penetration for safe substitutes and accelerate their introduction into our own domestic marketplace.

Third and most important, it will reduce the risks of rapid ozone depletion in the Antarctic, the potential risk of depletion in the Arctic, and the more troublesome but smaller risk of global ozone depletion at a catastrophic scale.

As Dr. Watson has pointed out to you, the current tenants of the Montreal Protocol will allow chlorine to build up substantially in the atmosphere. In fact, if the Montreal Protocol is implemented worldwide as it is currently structured, even if all of the industrial countries reduce their production and emissions by 50 percent, the current ceiling for use in developing countries would allow substantial growth in global production and use of the fully halogenated chlorofluorocarbons.

If just four countries, China, India, Brazil and Indonesia, for example, were to take advantage of the current provisions of the Protocol allowing them 0.3 of a kilogram per capita of CFC production in use, less than one-third of our own current annual use, we would more than double current annual production.

This bill gives us another alternative. It allows us to reduce the chlorine loadings in the atmosphere not ten years from now when the next stage of the Montreal Protocol might go into effect but next year and the year after. It allows us to do it by eliminating the frivolous and unnecessary uses that plague our own society. By so doing, we will demonstrate both to our allies and to those in developing countries who are skeptical about our intentions of our willingness to make change to protect the environment, especially when it causes no reduction to our own environmental quality or our economic well-being.

By reducing the unnecessary venting of chlorofluorocarbons to the atmosphere from mobile air conditioning, a use considered frivolous and unnecessary by many in other countries, we will preserve, I think, the ability of us to drive around in cool cars without damaging the ozone layer.

By banning Silly Strings and other party favors, we may make children momentarily less happy at their birthday but we will leave them with a happier and safer world for their adult lives.

By eliminating the use of halons in fire extinguishers, we may be able to find other ways to protect our computer systems in command bunkers and communications facilities.

There are a few elements of this bill which I think could be strengthened. One is in section 4, paragraph 3 on page 4, it indicates that facilities that are acceptable for recycling should meet the standards of the American Refrigeration Institute. You might think about broadening that so that we have certifiable recycling centers for other applications that meet the standards of purity that are required for those applications.

We are now today in the United States recycling CFC-113 as a solvent in the electronics industry. We ought to be able to encourage those efforts now under way to make them more widespread, and we ought to be able to stipulate that as long as CFC-113 is recaptured and recycled for electronic applications meets the needs of those applications that that is sufficient.

In addition, on the fire extinguishing side, even if we cannot find immediately available substitutes for halons—and I think they are ready to emerge in the market—what we ought to do is to stipulate the elimination of full flood testing procedures for these systems. We ought to require by statute that before these systems are tested the dangerous halon compounds are removed, the system is refilled and pressurized with safe compounds, nitrogen or other less damaging compounds at the same or equivalent densities and pressures so that we can tell if the system works, and then run the test. Drop the nitrogen into the room, for example, or drop whatever other benign compound we need and then refill them with the halons. Do not spill the halons to test the system. That is where the danger lies.

They are much more dangerous than CFC–11 or 12 to the ozone layer, and they have substantially larger global warming potential.

With these minor adjustments, I think we can make this bill a strong and important addition to the legislative statutes in the United States.

Thank you very much.

Senator **Bryan**. Dr. Mintzer, we thank you very much for your testimony.

We have been joined this morning by Senator Kerry. We are delighted to have you with us and extend to you an opportunity to make an opening statement.

Senator **Kerry**. Mr. Chairman, I appreciate that. I am not going to make an opening statement. I do have one for which I would like to have unanimous consent that it be placed in the record.

I do want to congratulate you and Senator Gore for proceeding forward both on a hearing in general and I think on the legislation specifically. We have had 15 years of warnings about this, and all the indicators are it just grows worse. So I think all the efforts, whether it is recycling or restrictions on automobiles and their refrigerants and so forth we need to engage in. I congratulate you.

[The statement follows:]

Opening Statement by Senator Kerry

Mr. Chairman, I would like to commend you for holding this important hearing on the urgent need for action to reduce the use of Chlorofluorocarbon, Halons, and other dangerous substances which are depleting our protective ozone layer. I would also like to commend Senator Gore for introducing the Consumer Ozone Protection Act of 1989.

For 15 years now scientists have been warning us that the release of CFCs into the atmosphere will deplete the delicate balance of ozone levels in the stratosphere. Evidence of an "ozone hole" over the Antarctic and the discovery that conditions may be right for the development of a similar hole over the Arctic, indicates that this destruction is far more reaching than initially expected.

We know what the consequences of damage to the ozone layer can be—increased incidences of skin cancer, cataracts, harm to marine life, and world-wide damage to agricultural crops. In addition, CFCs are greenhouse gases, and some scientists believe they will account for 25% of the total warming over the next half century.

Chlorofluorocarbons are very stable and can last in the atmosphere for decades. When CFCs reach the stratosphere 10 to 20 miles above the earth, CFC molecules break apart, releasing chlorine which depletes the ozone layer. One single atom of chlorine can destroy 100,000 molecules of ozone. Even if all CFCs were banned today, depletion would still continue for quite some time.

One area that can be addressed today that I am particularly concerned about is the use of CFCs in auto air conditioners. Air conditioners in our cars and trucks represent the largest end-use of CFCs in the United States, and as such represent the third largest use of CFCs worldwide. In addition these air conditioners use some of the most destructive CFCs.

Earlier in this session of Congress, I introduced legislation banning the domestic sale or export of automobiles which contain air conditioners that use CFCs. Beginning with model year 1993, 25 percent of the cars manufactured with air conditioners in the United States, or imported into the United States, must be free of CFCs. This would increase to 50 percent for model year 1994, and to 100 percent by model year 1995.

My bill like Senator Gore's legislation, requires that when auto air conditioners are repaired, that CFCs are reclaimed, recycled, or safely destroyed. And it bans the sale of small containers of CFCs, which are often used by consumers to put off necessary repairs. I strongly believe that this is the right approach, and that it should be undertaken as rapidly as possible.

As the largest user of Chlorofluorocarbons, the United States should lead the world in a complete phase out of CFCs. The Montreal Protocol represents a tremendous first step in international cooperation, but as we know we must go further and do it soon.

I was pleased that the Committee on Environment and Public Works included a provision in their section of the budget reconciliation to ban the use of auto air conditioners which use CFC beginning in model year 1994. As many of us are aware this section of the bill, along with a number of other provision, were stripped before consideration by the full Senate.

We cannot deceive ourselves; we do not have 10 years; we may not have 5 years; and we cannot meet this challenge without some sacrifice and inconvenience. The legislation being considered here today will help meet this threat by helping to contain one of the most widely used and dangerous uses of CFCs. It will also aid in the overall search for safe and sound alternatives to CFCs, and assist in our ongoing efforts to limit dangerous greenhouse gases.

I look forward to hearing the testimony here today and in continuing to working with all parties in the rapid elimination and replacement of these harmful substances.

Senator **Bryan**. Thank you very much for your comments, and your statement will be included as part of the record.

Ms. Cook, we would be pleased to hear from you.

Senator **Kerry**. If I might add, I would like to stay longer but we have a mark-up on a narcotics treaty in the Foreign Relations Committee to which I will have to go.

I hope that will not be taken as a sign of disrespect for the panel. Thank you.

Senator **Bryan**. Ms. Cook, good morning.

STATEMENT OF LIZ COOK, OZONE CAMPAIGN DIRECTOR, FRIENDS OF THE EARTH U.S.A.

Ms. **Cook**. Thank you. Good morning, Mr. Chairman and Members of the subcommittee. I am Liz Cook, Ozone Campaign Director of the recently emerged Friends of the Earth, Environmental Policy Institute and Oceanic Society. My statement this morning is made on behalf of the 45,000 members and supporters of our new global advocacy group known collectively as Friends of the Earth U.S.A. We are the U.S. affiliate of Friends of the Earth International, a worldwide environmental network with membership organizations in 35 different countries.

I greatly appreciate your invitation to appear here this morning to share our views on S. 870, the Consumer Ozone Protection Act of 1989. We would like to thank Senator Gore for introducing this legislation and Members of the committee for now considering its important provisions.

Congressional action to protect the earth's ozone layer cannot come too soon. As Dr. Watson just told us, this year's Antarctic ozone hole is likely to be one of the largest in history. It is a solemn reminder that we must do everything possible to curb emissions of ozone-destroying chemicals.

S. 870 identifies areas in the United States where CFC emissions are unnecessary and can immediately be eliminated. Most importantly, this bill will increase the ability of Americans across the country to participate in protecting the earth's ozone layer.

Before I summarize the reasons that we support this bill, first let me stress the importance of enacting national legislation in addition to participating in international efforts to preserve the ozone layer. Friends of the Earth is fully supportive of the Montreal Protocol on substances that deplete the ozone layer which the United States has ratified.

We are working aggressively with Friends of the Earth groups worldwide to strengthen this agreement and increase participation in it. The Montreal Protocol, however, does not require individual nations to take immediate action to eliminate unnecessary ozone-destroying chemicals. This responsibility is left to national governments and falls perhaps the greatest on the United States, the world's largest consumer of these destructive chemicals.

Governments around the world are implementing ozone protection programs more stringent than the Montreal Protocol. Unfortunately, the United States no longer leads the world in ozone protection as it did in 1978 when we were the first to ban the use of CFCs in aerosol cans. This bill will help put the United States back on track by ensuring that opportunities to protect the ozone layer are taken. It is by no means a radical proposal. Many of its provisions have already been enacted by various nations and individual states in our own country.

My first reason for supporting this bill is that it will cut emissions from the largest source of CFCs in our country; that is, from mobile air conditioners. This is the single largest source of CFCs in our Nation, accounting for 25 percent of all those that we consume and 7 percent of all the CFCs consumed in the world. This bill will do that by requiring the recovery and recycling of the CFCs. Equipment is now available to do this on site at service shops. Many states have already passed legislation that will require the use of this equipment, and Friends of the Earth has worked with industry to design legislation that is technically feasible to implement.

One of the problems at this time is that citizens want to have an opportunity to help protect the ozone layer but they cannot find places where they can bring their car and have the CFCs recycled.

The second way that this bill will cut emissions from the source of mobile air conditioning is that it will ban the sale of CFCs for recharging car air conditioners in small cans. That would limit the ability of the consumer to go to the auto service shop, buy a recharge kit like this and top off a car air conditioner that is sometimes leaking.

With the worsening condition of our ozone layer, it is unacceptable that a consumer, an individual, can go into an auto service shop and buy several cans of CFCs to keep an air conditioning system running for the summer. These CFCs will last over a century in the atmosphere.

I would like to note that Australia has already banned the sale of the small cans of CFCs for recharging your car air conditioner.

The second thing that this bill does is ban the sale of halon fire extinguishers for home use. Let me stress that halons are more potent ozone destroyers than CFCs, and this is one application of these chemicals where they are not necessary. Experts and even manufacturers of these fire extinguishers agree that other extinguishing agents are equally, if not more, effective for most residential uses.

I will add that our northern neighbor, Canada, is planning to ban the sale of the halon fire extinguishers beginning in January 1990.

Next, as you can see I have brought several products that you may be surprised to know are ozone destroying and are still on the market in the United States. The Consumer Ozone Protection Act will ban the use of nonessential CFC products.

You may wonder how can so many of these spray cans still be on the market and contain CFCs. When we passed legislation in 1978, it was very narrowly defined to ban only CFCs as aerosol propellants. This particular product, Dust-Off, is not a propellant. It is a can of pure CFCs, and it is used to dust photographic negatives and all sorts of equipment and surfaces.

I know from my own experience as a darkroom hobbyist that many other things can be used to dust off negatives, and even in the professional field I have worked in two different production houses where tanks of compressed air were used in one, Dust-Off in another, and there was absolutely no difference except for the severe impact that the Dust-Off would have on the environment.

Secondly, several people have mentioned already the party streamers. The CFCs in this product are considered a blowing agent and, therefore, they fell through a loophole. It is perhaps the most unbelievable product to fall through the loophole of the spray can ban in 1978. I will note that one manufacturer has already reformulated not to use CFCs so that there is no reason why we should continue to allow CFC-containing party streamers on the market. It is comforting to know that there will and can be a way for kids to play games without harming the ozone layer.

Lastly, one product which deserves particular attention is something that we would say deserves the Fraud of the Earth Award. This is Archer Cleaner/Degreaser sold by Radio Shack. It is a can of solvent filled entirely with CFC-113. It is not propelling anything but itself out of the can. On the back of this can, however, it is labeled as containing no fluorocarbon propellants. Not only does it destroy the ozone layer, but it misleads the public into thinking that they are buying a product that is safe for the ozone layer.

All of these products and several more, we think, should immediately be banned.

This brings me to the next point that I would like to make concerning labeling of products. This product demonstrates that it is very important that there be clear labels on products which destroy the ozone layer. Consumers have the right to know. They want to know. They are constantly calling Friends of the Earth and asking us what destroys the ozone layer. In several cases, they believe that styrofoam is the entire problem. That is not the case, and we would like to ensure that clear labeling is available.

One final point is consumers also want to know how they can dispose of their home refrigerators that contain CFCs. Recycling is now taking off in a big way in mobile air conditioning, but this bill would not only ensure that that takes place in a widespread way but it would also explore other opportunities for ways that we can recover CFCs and recycle them. One opportunity is the recovery and recycling of the CFCs in home refrigerators. This is a very important thing, and we support that provision of the bill as well.

This concludes my statement this morning. I thank you very much and would be happy to answer any questions.

[The statement follows:]

STATEMENT OF LIZ COOK, OZONE CAMPAIGN DIRECTOR, FRIENDS OF THE EARTH ENVIRONMENTAL POLICY INSTITUTE OCEANIC SOCIETY

Mr. Chairman and Members of the Subcommittee:

I am Liz Cook, Ozone Campaign Director of the recently-merged Friends of the Earth, Environmental Policy Institute, and Oceanic Society. My statement this morning is made on behalf of the 45,000 members and supporters of our new global advocacy group, known collectively as Friends of the Earth-USA. We are the U.S. affiliate of Friends of the Earth International, a worldwide environmental network with member organizations in 35 countries.

I greatly appreciate your invitation to appear here this morning to share our views on S. 870, "The Consumer Ozone Protection Act of 1989." We would like to thank Senator Gore for introducing this legislation and members of the subcommittee for now considering its important provisions.

Congressional action to protect the Earth's ozone layer cannot come too soon. This year's Antarctic ozone hole, one of the largest in history, is a solemn reminder that we must do everything possible to curb emissions of ozone-destroying chemicals. S. 870 identifies areas in the United States where chlorofluorocarbon (CFC) emissions are unnecessary and can be immediately eliminated. In my testimony today, I will detail why we support the provisions of this bill and suggest a few technical modifications to strengthen it.

First, let me stress the importance of enacting national legislation in addition to participating in international efforts to protect the ozone layer. FOE is fully supportive of the Montreal Protocol on Substances that Deplete the Ozone Layer which the United States has ratified. We are working aggressively with Friends of the Earth groups worldwide to strengthen the agreement and increase participation in it. We know that global cooperation to eliminate all ozone-destroying chemicals is the only way to achieve our goal of driving chlorine levels below those which caused the Antarctic ozone hole.

In its broad reach, however, the Montreal Protocol does not require individual nations to take immediate action to eliminate unnecessary ozone-destroying emissions. This responsibility is left to national governments, and falls perhaps the greatest on the United States, the world's largest consumers of these destructive chemicals. Current EPA regulations, which implement the Montreal Protocol in the United States, solely limit CFC and halon production through staged reductions. These regulations do not attempt to minimize emissions by placing controls on user industries or banning certain products. Far greater action can be taken to reduce our nation's contribution to the ozone depletion problem.

Governments around the world are implementing ozone protection programs more stringent than the Montreal Protocol. Unfortunately, the U.S. no longer leads the world in ozone protection as it did in 1978, when the government banned the use of CFCs in aerosol cans. S. 870 will help put the United States back on track by ensuring that opportunities to protect the ozone layer are taken. S.870 is by no means a radical proposal. Most of its provisions have already been enacted by various nations and individual states.

Friends of the Earth supports S.870 because it would:

1. Cut CFC emissions from car air conditioners, the nations's largest source of CFCs.
2. Prohibit the sale of halon fire extinguishers for home use.
3. Ban nonessential consumer CFC products.
4. Require warning labels on products manufactured with or containing ozone-depleting chemicals.
5. Develop programs to recover, recycle, and safely destroy ozone-depleting chemicals.

The following elaborates on our reasons for supporting this important legislation.

Mobile Air Conditioners

1. S. 870 would cut CFC emissions from automobile air conditioners, the largest source of ozone-destroying pollution in the nation.

The CFCs used in car air conditioners accounts for approximately twenty-five percent of all the CFCs consumed in the United States. This is the largest single source of ozone-destroying emissions in the country, accounting for about seven percent of all CFCs used worldwide. CFC use in this sector is high because the CFC refrigerant escapes into the atmosphere from leaking air conditioning systems and during servicing. S. 870 would cut CFC emissions by requiring mechanics to change their servicing practices. It would also implement measures to prevent individuals from misusing CFC refrigerant and recharging leaking car air conditioners.

*** S. 870 would mandate the recovery and recycling of CFCs used in automobile air conditioners. Nationwide recycling could cut CFC emissions from this source in half.**

Common servicing techniques, which discharge CFC refrigerant into the atmosphere, produce excessive and unnecessary CFC emissions. S. 870 would require mechanics to use equipment which, instead, recaptures the CFCs for recycling. EPA data shows that recycling could potentially reduce this source of CFCs by 50 percent.[1] We fully support mandatory recovery and recycling of CFCs used in car air conditioners.

S. 870 specifies that recovered CFCs should then be delivered to a CFC recycling facility. Cooperation between the EPA and the automobile service industry to develop CFC recycling standards, however, has cleared the way for widespread on site CFC recycling. Equipment now exists to recover the CFCs from car air conditioners and purify them at the service shop for reuse. FOE suggests that the Committee alter the bill slightly to mandate only the use of equipment certified to meet the standard of purity adopted by automobile manufactures.

Because development of recycling technology presents a tremendous opportunity to cut CFC emissions, FOE's domestic Ozone Campaign has focused much of its attention on promoting the use of this equipment at auto service shops. During the 1989 legislative session, several states mandated the use of CFC recycling equipment. FOE worked with representatives of the automobile service industry, such as Mobile Air Conditioning Society (MACs) and the Society for Automotive Engineers (SAE), to help state legislators design legislation that is technically feasible to implement. Hawaii, Vermont, Oregon, and Connecticut have enacted laws. Most of these states will have full recycling programs in place by January 1991. (See attachments on state legislation.)

CFC recycling has gained further acceptance with recent announcements by several automobile makers that they will mandate the practice at their dealerships. General Motors, Volvo, and Ford have all said they will require their dealers to purchase and use the recycling equipment by the 1991 model year.

Despite encouraging voluntary movement toward recycling, national legislation is necessary to ensure that all service shops recycle. On several occasions, industry has expressed its support for a federal program because it would standardize recycling requirements and subject all shops to similar economic investments.

On October 12th, at a meeting of EPA's Automobile Ad Hoc Recycling Committee, EPA's Dr. Stephen Andersen announced that the Agency intends to publish a rulemaking proposal to mandate CFC recycling from car air conditioners. The announcement was prompted by an industry petition for a national CFC recycling regulation and met with general enthusiasm by those present at the meeting.

With industry support, state legislation already enacted, and wasteful emissions to be eliminated, there is little reason for Congress not to support mandatory CFC recycling from auto air conditioners.

*** S. 870 would ban the sale of CFCs for use in car air conditioners in containers smaller than thirty pounds. Small cans of CFCs are a source of unnecessary emissions.**

Additional CFC waste comes from small cans of CFC refrigerant sold in stores across the country. Consumers use these 14-ounce cans to charge leaky systems, but often do not fix the leak. The "do-it-yourself" recharge cans are also not easily resealed, so leftover CFCs readily enter the air without being used. S.870 would ban the sale of these small containers of CFC refrigerant. With the worsening state of the ozone layer, it is unacceptable that consumers can easily buy several cans of CFCs, which last a century in the atmosphere, just to keep a leaky car air conditioner running for the summer season. We fully support this ban.

FOE has promoted mandatory recycling and a small can ban as a dual program which would cut CFC emissions at the service shop and limit the do-it-yourselfer's ability to "top off" leaky car air conditioners. The goal of such a program is to direct vehicle owners to a service facility where CFC recycling equipment is used. All the states which have passed recycling legislation also restricted the sale of CFCs in small containers. Additionally, Australia passed national ozone protection legislation which banned the do-it-yourself auto air conditioning recharge kits as of January 31, 1989.

* S.870 would prohibit individuals from recharging auto air conditioners with CFCs without first repairing leaks.

There is a growing consensus that servicing of car air conditioners should only be done by mechanics who can repair leaks and operate CFC recycling equipment. S.870 prohibits individuals from recharging air conditioners without first checking for leaks in the system and repairing any if found. While the small can ban limits the do-it-yourselfer's ability to do this, mechanics typically recharge without repair because it is significantly less expensive for their customers. FOE supports the provision of S.870 that would make it illegal to knowingly put CFCs into a leaky system. Since this provision may be difficult to fully enforce, FOE suggests the committee consider ways to include an education program in the bill that would teach mechanics about the environmental costs of such a practice and the benefits of CFC recycling.

Portable Halon Fire Extinguishers

2. S.870 would ban the sale of halon fire extinguishers for consumer applications. Suitable ozone-safe alternatives for this product exist.

Halons, used to extinguish fires, are more potent ozone-destroyers than CFCs. S.870 would ban the use of halons in hand held halon fire extinguisher for home use, an application for which experts and manufacturers have identified suitable alternatives. For example, dry chemical extinguishers are more effective than halons in putting out kitchen grease fires.

A June 1989 halon technical options report concludes that multi-purpose dry chemical fire extinguishers performed better than halon 1211 portables on ordinary combustibles and liquid fuel fires. When several agents were tested on a range of residential applications, and the scores adjusted to reflect their environmental and societal impacts, dry chemical scored the highest and halon scored the lowest.[2]

These findings are consistent with testimony from Ansul Fire Protection, a manufacturer of halon fire extinguishers, before the EPA January 8, 1988. When asked by the EPA if the halon extinguisher sold for the home market was a critical use, Bill Columbus of Ansul responded, "In many instances, the application of a 1211 to a fire might not be the right--there are other substitute agents that do the same job. There are a few instances, that is not true, in industrial applications. But in some residential applications certainly that is definitely true."[3]

Some governments have recognized that halon fire extinguishers are not essential for home use and are taking action. Beginning in January 1990, halon fire extinguishers cannot be sold in the State of Vermont for any non-commercial or non-industrial usage. Also, the Canadian government will soon publish regulations that will ban the sale of portable halon fire extinguishers for home use nationwide by January 1, 1990.

Nonessential Consumer CFC Products

3. S.870 would ban the sale of nonessential consumer products

containing CFCs. The U.S. should have banned these products long ago.

Several nonessential consumer products slipped passed the 1978 ban on CFCs in spraycans. The regulation banned only those nonessential products in which the CFCs served as an aerosol propellant. Consequently, a few pressurized container products filled 100 percent with CFCs are still on store shelves. Examples of these products include Dust-Off dust remover and Sound Off! noise horns. The CFCs in these products are not defined as aerosol propellants, but nevertheless they should have been banned. Alternative products exist, and their use is not essential in most applications.

Dust-Off, for instance, is used to remove dust from photographic negatives, video equipment, and various other surfaces. As a darkroom hobbiest, I know that mechanical dusters can be used instead of CFC gas. At the professional level, tanks of compressed air serve the same purpose. Formerly, I worked at two slide show production companies. One used Dust Off and the other used compressed air. The performance of the two products is very similar, but their impact on the environment is tremendously different.

Falcon Safety Products, the manufacturer of Dust-Off, has begun to reformulate its product to blow HCFC-22 instead of CFCs. This chemical is 95 percent less harmful to the ozone layer, but still a slight ozone-depleter. HCFC-22 is not on the priority list of regulated chemicals in S.870, but it is listed under other regulated substances. Therefore, S.870 would also ban the new version of Dust-Off. We support the extension of the product ban to include nonessential products containing HCFCs. While HCFCs are useful because they can allow manufacturers to make an early switch away from more damaging CFCs, their use should be reserved for high value applications.

Other CFC spraycan products slipped through the aerosol ban because they too are not defined as an aerosol propellant. The most unbelievable example of this loophole is spraycan party streamers. In this instance, CFCs are used as a "foam blowing agent" to propel plastic foam streamers from a can. This frivolous use of an extremely dangerous chemical should be banned without question. At least one manufacture, Fun World, has started making its "String Confetti" without CFC. This is further reason to prohibit companies from making the product with CFCs. It also shows that kids can still play games without destroying the ozone layer.

Finally, several spraycans containing CFCs are still on the market because they are defined as solvents. One such spraycan, Archer's Cleaner Degreaser sold by Radio Shack, is comprised entirely of the solvent CFC-113. This product, which cleans electronic equipment is not only ozone-destroying, it is what we call a "Fraud of the Earth." Cleaner Degreaser bears the label "Contains No Fluorocarbon Propellants" misleading the public into thinking that this spraycan is actually safe for the ozone layer.

FOE strongly supports the banning of the CFC consumer products mentioned above and any others the Secretary of Commerce identifies as nonessential. Vermont and Oregon have already banned the sale of such products beginning January 1, 1990.

Warning Labels

4. S.870 would require products manufactured with or containing ozone-destroying chemicals to bear a warning label. Consumers have the right to know which products harm the ozone layer.

Clean Degreaser highlights the need for clear labeling of products which contribute to ozone depletion. S.870 would require all products that have been manufactured with or contain ozone-destroying chemicals to bear a warning label. FOE hopes that this provision also includes labeling of containers designed to store or transport these chemicals. The public has the right to know which products harm the ozone layer. Given the fact that life on Earth depends on the existence of the ozone layer, the government has a responsibility to ensure that the public is informed.

Public awareness and pressure are essential for bringing about swift reductions in CFC and halon consumption. Consumers must be allowed the option of reducing the risk of ozone depletion, but can only do this if they know which products create that risk. This is especially true if alternatives are immediately available; consumers can only chose a non-ozone depleting product when they know there is one.

Labeling can also help prevent misuse of CFC and halon products. For example, some "do-it-yourself" auto mechanics may not know that the refrigerant they add to a leaky air conditioner is harmful to the ozone layer. A warning label would inform them between now and the time these cans are banned.

Where alternative ozone-safe products are not presently available, mandatory labeling provides a marketplace incentive for manufacturers to either alter their products to eliminate CFCs or halons or at least quickly implement substitute chemicals as they become available. Since corporate responsibility and public image can influence sales, we believe that labeling will encourage manufacturers to act responsibly more quickly.

In Europe, where green consumerism is on the rise, several manufacturers are voluntarily marking their products with positive labels. "Ozone-friendly" is among the most popular. Simon Gould, Marketing Director of Alberto Culver, one of Britain's largest hairspray manufactures, reported that sales doubled two months after the company started labeling its products ozone-friendly.[4]

AEG, a European appliance manufacturer, also reports that its white good sales in the United Kingdom have increased by 30 percent since it launched a 1.6 million pound advertising campaign to promote its "green machines."[5] AEG has touted the energy efficiency of its appliances and reduced levels of CFCs inside the foam in its refrigerator walls. Many appliance manufactures in Europe now use positive labels. (See attachment of European appliance labels)

We are encouraged that manufacturers are voluntarily labeling and using ozone safe as a selling point. This is also happening in the U.S., although to a lesser degree at this time. There is an important need, however, for a standard national warning label and guidelines for accurate positive labeling. Friends of the Earth in the United Kingdom has found that the range of ozone-friendly labels confuses consumers. While some accurately detail that CFCs are "50 percent reduced," others under the same circumstances advertise the product "ozone friendly." A consistent, concise message to the public will influence the market and assist consumers in making informed, risk-reducing choices.

The quick rate at which U.S. aerosol manufacturers moved away from the use of CFCs as a propellant in the 1970's further supports the fact that both public education and regulation requiring a CFC warning label can be effective. Once the public knew that certain aerosols were possibly destroying the ozone layer, the market responded by providing pumps and alternative propellants.

Additionally, the Food and Drug Administration's rulemaking process requiring a warning label on certain non-essential CFC propelled aerosol products prompted further reductions. In the FDA's Final Rule, the Commissioner welcomed the voluntary decline in the use of CFC propellants and emphasized the effectiveness of a labeling regulation. The Rule stated:

> The switch to alternatives by manufactures may be in anticipation of the issuance of the final rule requiring the warning and the effect the warning will have on consumer purchases. (42 Fed.Reg. 22030 4/29/77)

While an imminent ban was a factor in bringing about reductions, public demand and market sensitivity pushed the process faster. By the time the Final Rule banning CFC propellants in non-essential aerosols was issued, only 20% of aerosol products contained CFCs. (43 Fed. Reg. 11319 3/17/78)

Reductions in all ozone-destroying product areas must be put on a fast-track. Friends of the Earth's experience with public inquiries about the ozone layer, however, indicates that many Americans do not know which products contribute to ozone depletion. In fact, some people believe that the problem was solved with the aerosol ban; others believe styrofoam is the nations's largest use of CFCs. Labeling provides an opportunity to educate the public and clear up these misconceptions.

Recovery and Recycling Programs

5. S.870 would require the development of a nationwide CFC and halon reclamation plan. Widespread programs to recover, recycle, and destroy these compounds are essential.

While the auto industry is making progress to recycle the CFCs used in car air conditioners, other industry sectors lag behind. S.870 would require the U.S. government to explore other recycling options and set up programs where they can be implemented.

Engineers are rapidly developing new recovery and recycling technologies. Three days ago, Whirlpool Corporation announced it has developed a process to recover CFCs previously lost to the atmosphere during repair of refrigerators and freezers. Whirlpool reports that this multi-layered plastic recovery bag is convenient and simple to use. Only months earlier, General

Electric was publicly criticized for its plans to release 300,000 pounds of CFCs in a national effort to repair one million refrigerators with faulty compressors. At the time, a G.E. spokesman said the company would use reclamation equipment, but no suitable equipment was available.[6] The U.S. government should mandate the use of technologies, such as the Whirlpool recovery bag, once they are tested and approved.

There is also a shortage of facilities where CFCs can be recovered and recycled. Many concerned citizens contact us about where they can bring their old refrigerators for safe disposal. We have few answers for them. Last week at the International Conference on Alternatives to CFCs and Halons, Jack Cameron of the Appliance Recycling Centers of America (ARCA) in St. Paul spoke about a promising recycling program. His company will pick up old refrigerators, recover the CFCs, remove the PCBs and scrap the metal. In addition to preventing CFC emissions, his business saves valuable landfill space. ARCA operates in St. Louis, Atlanta, Milwaukee, and St. Paul. S. 870 would help expand programs like this beyond just a few cities.

These are just a few examples of areas where recycling programs can and must be expanded. Congressional action is necessary to ensure that ozone-destroying emissions are reduced nationwide to the fullest extent possible.

Thank you again for inviting me here today. We commend this committee for taking up this very important legislation and urge you to approve it as quickly as possible.

Notes

1. Regulatory Impact Analysis: Protection of Stratospheric Ozone, Volume III: Addenda to the Regulatory Impact Analysis Document, Part 3: Mobile Air Conditioning. Radian Corporation for U.S. Environmental Protection Agency, p. 2-5.

2. Technical Progress on Protecting the Ozone Layer, Halon Fire Extinguishing Agents Technical Options Report, June 30, 1989. United Nations Environment Program Montreal Protocol Assessment Technology Review, pp. 32, 39.

3. Transcript of Proceedings, EPA public hearing on Stratospheric Protection January 7, 1989, p. 237.

4. Chemist and Druggist, June 11, 1988.

5. Environmental Data Services Report, June 1989.

6. Washington Post, June 24, 1989.

Senator **Bryan**. Ms. Cook, thank you very much for your testimony.

Mr. Hobbs.

STATEMENT OF ARTHUR G. HOBBS, JR., VICE PRESIDENT, MOBILE AIR CONDITIONING SOCIETY, COCKEYSVILLE, MD

Mr. **Hobbs**. Thank you, Mr. Chairman and committee members for allowing us the time to present our testimony.

The Mobile Air Conditioning Society is a broad-based international society. Its membership is made up of air conditioning manufacturers, distributors, professional service technicians and installers. I have served on the board of directors for three years and currently hold the office of vice president.

I spent 30 years in the automotive mobile air conditioning industry. I have been product manager for one of the largest automotive aftermarket suppliers of air conditioning parts and equipment which also manufactures CFC recovery equipment for on-site reclamation. I am here today, however, representing the Mobile Air Conditioning Society.

We wish to address section 5 of S. 870 on mobile air conditioning. In section 5, you state that any person who installs, services or repairs mobile air conditioning should use chlorofluorocarbon recapturing equipment. We at MACS fully concur with this statement, as does most of the automotive industry.

This equipment must be UL listed and design certified to SAE J1991 as per the UL Standard of 1963. Many manufacturers are already making it mandatory for their service facilities to own this type of equipment.

In section 5, however, you call for chlorofluorocarbon CFC-12 to be picked up and delivered to a recycling facility. We currently have a purity standard developed by the EPA Ad Hoc Committee and accepted by the Motor Vehicle Manufacturers Association and most of the world automotive manufacturers. The Society of Automotive Engineers has set the following standards. These are referred to in many of the State bills: SAE J1989 service procedures for containment of CFC-12; SAE J1990, extraction and recycling equipment for mobile air conditioning systems; and SAE J1991, the standard of purity for use in mobile air conditioning systems.

At the current time, Murray Corporation and Robinaire, which is a division of SBX Corporation, and White Industries have recycling equipment which has been approved to the standards of Underwriters Laboratory 1963. We are sure we will see more manufacturers approved in the very near future.

Please note that all of the above certified systems are capable of on-site recovery and repurification of CFCs; thus, there is no need for the costly storing, pick-up and trucking of CFCs to recycling facilities which do not exist on a readily available basis. On-site recovery equipment is currently available so that when central facilities for CFC recycling and repurification to SAE J1991 are available, the equipment will be in place.

On-site recovery and purification will be the way of the future even when the new refrigerant 134A is available in the vehicles of 1993 and 1994. As stated before, this has been approved by the Motor Vehicle Manufacturers Association.

We feel very strongly that on-site recovery and purification will place less of a burden on the motoring public as well as the small independent business operator and should be a viable alternative.

S. 870 calls for the resale of minimum quantities in containers of 30 pounds. May we suggest that this be changed to 20 pounds, as many states and some foreign countries are using this figure. This would be global continuity. Many of the on-site recovery units are set up for their reclaim tanks to hold 17 to 25 pounds. The owners of this equipment would not be selling the tanks, just the CFCs which have been reclaimed and recaptured.

S. 870 calls for states to establish a phase-in schedule for acquisition of equipment. To achieve this end and in order to avoid confusion that will be created by the patchwork of State regulations, the EPA must mandate recycling for all service facilities by January of 1992.

It is equally important that the Federal mandate include limits of the sale of CFC-12 to facilities that are properly equipped, with personnel that are properly trained and certified to handle this material. The Mobile Air Conditioning Society is currently working on a certification program that will dovetail into the ASE, Automotive Service Excellence Testing, which takes place on a voluntary basis twice a year throughout the United States.

In our packet of information you will find a copy of the MACS News. This will give you the text of the speech our Executive Director, Mr. Simon Oulouhojian, gave at the International Conference on CFC and Halon Alternatives held here in Washington, D.C. on October 10 and 11, 1989.

Also in that packet you will find the MACS action on CFCs issue, and you will see that the MACS organization immediately assumed an active role in the development of a response to the environmental concerns expressed in the 1987 Montreal Protocol.

It was through the cooperation and guidelines of Dr. Steven Anderson and Mrs. Jean Lappinachi of the EPA, the Motor Vehicles Manufacturers Association, the Society of Automotive Engineers and the CFC Equipment Manufacturers that we have been able to advance in such a short period of time to where we are today.

At the CFC conference EPA informed the ad hoc committee they will be proposing a regulation as per ARN of August of 1988 for comments expected in late January of 1990 to regulate and require all automotive service facilities to have CFC recovery in place by January of 1992. We fully support efforts to eliminate the release of CFCs into the atmosphere while alternative refrigerants are found.

Please feel free to call on us or anyone in our organization for any answers to questions you may have.

Thank you.

Senator **Bryan**. Mr. Hobbs, we thank you for your testimony.

Dr. Watson, we have been informed you have a tight schedule, in terms of your flight out, so let me ask you, first, to amplify some of your comments about where we are on the technology of substitutes and the risk levels as you find them. Are they unacceptable? If there are some risks that you find unacceptable, is there another generation of technology that is on the horizon, but not yet there?

Dr. **Watson**. Yes, Mr. Chairman.

Unfortunately I cannot discuss the state of technology; it is well outside my area of expertise. What I can touch upon is the state of the environmental acceptability of the proposed substitutes.

In a document called the APHEAS document, which is an appendix to the latest international ozone assessment, we critically examine all aspects of the substitutes. We think we have a fairly decent analysis of the lifetime of these substitutes. And the lifetime of the substitutes is proportional to what likely environmental damage they would do with ozone and with global warming.

And we have to look at both aspects, both ozone and global warming.

Where we are concerned at the moment is that these molecules are large molecules, all containing at least carbons. And the reason they do not reach the stratosphere is they break down chemically in the lower atmosphere, called the troposphere. What we do not know with certainty is what these degradation products are.

We now have to be concerned that these degradation products may themselves be ozone depleting or may themselves be infrared active and possibly cause a global warming.

Now we have looked at what I call analogous chemicals, chemicals that have similar structure to these substitutes, but only contain hydrogen, similar hydrocarbons. If we went by analogy, these compounds are most likely to be environmentally acceptable. That is, much more environmentally acceptable than the CFCs. They still do have a greenhouse potential. They will still contribute to a predicted global warming, albeit on the average a factor of 10 or so less than the current CFCs.

It is a political decision as to whether that is environmentally acceptably. They are environmentally better.

So, by analogy, they look a lot safer than CFCs. But until we have done those direct studies in the laboratory with the molecules themselves, rather than by analogy with similar hydrocarbons, I think it would be foolhardy to give them a complete green light.

I believe that a concerted research effort, I would suggest, between both the federal agencies and by the producer industry, we could get the answers within a two- to three-year time period of most of the important questions. That would be consistent with the time frame for these long-term toxicological tests.

I believe that would be the prudent and the sensible way to go.

Senator **Bryan**. Dr. Watson, if I am understanding your testimony, you are saying that you are not yet prepared to give these substitutes the Good Housekeeping Seal of Approval, so to speak; that the jury may be out, but that they appear, at this point, to be much safer than what we are presently using?

Do you recommend that we continue on course as we are now?

Dr. **Watson**. Yes, I would. In the same way that the toxicological tests, at first sight, look to be good, I would say the first indications, from an atmospheric chemistry point of view, look good. I would suggest one proceed on course with the development of these substitutes, but in parallel, we must do these additional tests before we give them the final green light.

Senator **Bryan**. Dr. Mintzer, I want to hear from you in just a second, but Dr. Watson may be scooting out and I just want to catch him if I can before he does.

Dr. Watson, one question, in response to Mr. Hobbs' testimony. He suggested, with respect to one provision of Senator Gore's bill, that recovery and purification can be done on site without environmental degradation, and would be much easier for the service centers as well as the consuming public.

Would you give us your assessment as to the environmental impact, if any, on that proposal?

Dr. **Watson**. I honestly cannot comment. I am not expert enough to testify. The key issue is we must not allow the CFCs to escape to the atmosphere. If one can ensure that, then any recycling provision would be adequate. We must ensure they are not released into the atmosphere.

Senator **Bryan**. And Senator Gore has gone to considerable efforts to prepare that chart, and since we have you here for just another four minutes, if our information——

Senator **Gore**. Actually, Mr. Chairman, we have arranged for a car to take Dr. Watson back to the airport. And I think that will give him a few extra minutes.

Senator **Ford**. If there is not a wreck on 14th Street.

Senator **Bryan**. Dr. Watson, if we could ask you, then, to come on up and take us through that chart that has been prepared, and help us to build a record.

Dr. **Watson**. This was a graph put together by the U.S. EPA and concurred upon by the technology panel as to the best of their ability on the international assessment.

What this suggests is if you have the Montreal Protocol with 100-percent compliance, and we have to recognize China, India, and several other countries have not signed it, then we would predict the amount of atmospheric chlorine would increase on the order of 10 parts per billion by the year 2100.

Senator **Gore**. Just to back up there, Mr. Chairman, if you do not mind. The left-hand side, where the graph starts, right there, the concentration is just under three. That is where we are now, correct?

Dr. **Watson**. Correct.

Senator **Gore**. And the ozone hole and the environmental damage that is taking place right now is associated with concentrations there on the left-hand side, right?

Dr. **Watson**. Correct.

So that is the point. If we want to get rid of the Antarctic ozone hole, we have to get below two parts per billion, way down here.

With the Montreal Protocol we would end up with at least 10 parts per billion. Even with a complete ban of CFCs, we would still end up with about seven parts per billion. That is because we still continue to produce carbon tetrachloride and methyl chloroform.

If we have a phase out of carbon tetrachloride, which the technology panel says is technically feasible, there are alternatives for carbon tetrachloride, we would go down to about six parts per billion, still unacceptable.

This assumes there would be growth in the methyl chloroform industry. If indeed there was only a freeze in methyl chloroform and there was no growth, we could actually reduce chlorine even further, down to four and a half, still unacceptable.

A phase out of methyl chloroform reduces us down to about three and a half parts per billion.

Now in all of these calculations, one has assumed a substitution for the CFCs when they are phased out by HCFCs. There has been an assumption that there is a 50-percent penetration of the market for every pound of CFCs produced today, and there would only be half a pound of substitute produced in the future, with an average ozone depleting potential of 0.05, one-twentieth that of fluorocarbon-11.

If one goes down to only a 20-percent substitution of HCFCs, with an average ozone depletion of .05, we are still only just stabilizing to the three parts per billion of today. And if you have a 35-percent substitution, but now with an average ozone depletion all the way down at .02, you can see we are still around three.

This was the very same figure that made me extremely alarmed. What this message gives me is we cannot have HCFC substitution, even with compounds of an average ozone depletion potential of .05, for a long period of time.

What you will see in my testimony is there is a way to protect Antarctic ozone. If you assume the most draconian actions are a complete elimination of all chlorine-containing compounds, the best you can ever do, then the chlorine effectively moves up here and comes down low. And you will see it in the figures.

The quickest you can reach two parts per billion is by about the year 2075, assuming 100 percent compliance throughout the years. So, then, if you know the best you can do is the year 2075, can you allow substitution of any HCFCs? The answer is yes, as long as you only give them the green light for some limited period of time.

If a substitute, for example, had a 20-year lifetime, of which some of them do, you would have to stop producing that substitute roughly 50 years before the year 2075, what I call two and a half lifetimes.

If the substitute only has a 10-year lifetime, you would want to stop producing 25 years before.

So, in other words, one can look to see how long could you allow industry to produce a substitute before you would have to ban it, in order to get back to the magic two parts per billion by the year 2075? And my testimony goes into that. And that does mean that you have got a window, possibly as long as 30 or 40 years, where you could conceivably produce HCFCs and still get back to two parts per billion by the year 2075.

But you cannot, as this graph shows, produce them forever.

What you also have to consider with substitutes is do they affect the peak chlorine loading. The higher the chlorine loading is, the more probability of global ozone depletion, and the higher the probability of ozone depletion in the Arctic. Completely unacceptable.

So we want to limit the peak chlorine loading, and the message is the quicker we can reduce the long-lived CFCs and carbon tetrachloride worldwide, the better.

Regulations in 1995 are much better than regulations in the year 2000. Incremental regulations are all an advantage over doing everything in the year 2000.

So we must make sure that we regulate as soon as possible. That will reduce peak chlorine loading. We must try and get 100 percent compliance throughout the world. Small levels of non-compliance could be a disaster, basically.

The other issue is how quickly can you reduce the peak chlorine loading once you ban the long-lived CFCs. Here, any substitution of HCFCs obviously adds chlorine to the atmosphere, by definition. And so one has to consider do you just want to stabilize your chlorine and then tail off, or do you want to bring it down quicker?

The advantage of a ban on methyl chloroform today is it has a short lifetime of only about six years. A ban on methyl chloroform quickly reduces the atmospheric loading of chlorine. And so when one considers regulations, it is essential to get rid of the very long-lived CFCs. They control the time at which we can get rid of the Antarctic ozone hole.

A ban on methyl chloroform means the chlorine comes out of the atmosphere relatively quickly, so we can reduce peak chlorine loading related to the probability of global ozone depletion and Antarctic loss. One can have some level of substitution, and that is a policy decision. What is an allowable increment of chlorine from the substitute? And it is very easy from science, the best science we have today, to say when you must stop those HCFC substitutes.

The other issue you need to look at very carefully is what the greenhouse warming potential is of all of these substitutes. They are typically a factor of 10 better than the CFCs they would replace, but they themselves, if used in large concentrations, clearly, would indeed contribute to a global warming.

And so one has to marry environmental protection against some level of pragmatism.

Senator **Bryan**. Dr. Watson, thank you very much.

My 5 minutes has expired.

Senator Gore.

Senator **Gore**. Dr. Watson, before you leave the chart could you examine the edge of that chart, not the front of it, the edge of the chart, and give us your scientific opinion as to what that material is made out of?

Dr. **Watson**. I have no idea. I am a simple scientist.

Senator **Gore**. Somebody advised me earlier that since it is a rigid foam, it has a very high likelihood of being made out of CFCs, which makes us part of the problem also.

Dr. **Watson**. Right.

Senator **Ford**. Paper producers.

Senator **Gore**. Well, if it were paper, it would be all right.

Senator **Ford**. We are having more visual aids in the Senate now than in the last 15 years.

Senator **Gore**. I will bet that is right.

Dr. Watson, let me add my thanks to those expressed by the chairman already for your courtesy to the subcommittee and your willingness to really mangle your schedule by flying in and testifying and responding to a few questions and then rushing back to the airport. We appreciate that very much.

And I might add for the record, Mr. Chairman, that I do not know of any single human being alive who has done more than Dr. Watson to advance our understanding of this problem. I know you do not react well to that kind of a statement, but seriously.

You were making a point about the HCFCs and saying, basically, that we have got to be prepared to phase them out pretty quickly if we use them as substitutes for the short term.

Why should somebody living in Tennessee or Kentucky or Nevada be worried about the destruction of this percentage of the stratospheric ozone layer?

Dr. **Watson**. I think, Senator, you have already said it very eloquently. The issues at stake are human health and possible loss of food productivity and fish life.

For every 1-percent change in ozone, there would be a 2-percent increase in ultraviolet radiation reaching the ground. That would lead to both increases in non-melanoma and melanoma. We can quantify the increase in non-melanoma, and that is for every 1 percent ozone depletion, there would be a 3- to 5-percent increase in the number of white-skinned people contracting non-melanoma skin cancer.

We have to remember that most people believe that is just an irritation, you get a skin cancer, you take it off. One has to remember 1 percent of the people contracting non-melanoma, indeed, die. So as many people die from non-melanoma as die from melanoma, and that has to be remembered.

In addition, while the database is not very good, the limited data we have on the production of soybeans and some other very important food crops suggests for every 1 percent ozone depletion there could be 1 percent loss of food productivity.

So we are indeed gambling with human health, which goes beyond skin cancer and includes eye cataracts and suppression of the immune response system just as Senator Gore has said this morning. So, indeed, this is a serious issue.

Senator **Gore**. And the effects on the food chain in the ocean are as yet not modeled completely, but there is every reason to be extremely concerned about the potential for catastrophic change in productivity of the seas, is that correct?

Dr. **Watson**. Yes, especially in the southern oceans in and around Antarctica, which are extremely rich in fish life, and effectively are the beginning of the food chain for most of the southern hemisphere. Here with the large Antarctic ozone hole lasting into the November-December time period, one has to be indeed quite concerned there would be significant adverse consequence, even though at the moment we cannot quantify them.

Senator **Gore**. Now, you said that if the atmospheric conditions in the northern hemisphere were a little different in any given year, there could be an ozone hole in the northern hemisphere as well.

Dr. **Watson**. That is correct.

Senator **Gore**. Now, basically, what has prevented that from taking place thus far?

And correct me if I am wrong, what I am trying to remember is what you have taught me before. But as I remember it, the wind pattern that makes this whirlpool around Antarctica is also present to some extent above the north pole, but before the sun's rays strike the north pole in the spring, that wind pattern slows down a little bit and the bowl of air it creates above the north pole breaks up before the sun's rays strike the chemical brew there. Is that correct?

Dr. **Watson**. Yes, in essence, the isolated air mass gets dispersed to other latitudes, correct.

Senator **Gore**. Now, there is reason to believe that that wind pattern could persist in an unusual year and remain in place long enough for the sun's rays to strike the bowl, so to speak, and cause an ozone hole above the northern hemisphere, correct?

Dr. **Watson**. That is indeed correct. And in fact, looking back on some of the statistics, we have seen that the polar vortex has stayed in place until the middle of March, approximately once every five to once every 10 years, over the last three or four decades.

So, indeed, now that we have this large amount of chlorine in the atmosphere, there is a distinct possibility that at least periodically we may well get this large ozone hole over the Arctic.

Senator **Gore**. Now in the southern hemisphere, recent studies have indicated that toward the end of the season, parts—sort of bubbles that break off from the ozone hole—float up above Argentina, South Africa, Australia, and other inhabited areas and cause dramatic losses in the ozone protection above populated areas.

Is that correct?

Dr. **Watson**. Yes, indeed. There are these isolated pockets of fairly large air masses, that when they break off, they are highly depleted in ozone and indeed for those short periods of time, a few weeks in the early springtime or even early summer, where large amounts of ultraviolet radiation can penetrate to the ground.

Senator **Gore**. So if the same phenomenon occurred in the northern hemisphere, if in the one in five years the wind pattern persists above the north pole long enough for the sun's rays to trigger the chemical reaction, and if the same breaking off phenomenon occurred in the north pole, you could have parts of an ozone hole floating above inhabited areas of the United States, with dramatic losses in the ozone protection for American cities that happen to be underneath those parts of it, correct?

Dr. **Watson**. Yes, that is exactly why we must limit the peak chlorine loading as soon as possible, because the depth of the hole, while it will not be as great as an Antarctic one, almost certainly it will be proportional to the amount of chlorine we put into the atmosphere. The more chlorine, the deeper that hole could be. Hence, if it occurs, and it floats over America, the less ozone there would be.

Senator **Gore**. Mr. Chairman, I hope we will have a second round so that we can get to these other three witnesses. I appreciate the time.

Senator **Bryan**. Senator Ford?

Senator **Ford**. Are our questions just limited to Dr. Watson right now?

Senator **Bryan**. Not at all. I think I probably got started on that, Senator, because we were initially informed that Dr. Watson had to leave by 10:30, but no, questions may be directed to the full panel, and we will have a second round if we need to.

Senator **Ford**. Let me just approach this from a country boy's position. You are Ph.D's, or long years of experience, and most folks cannot even pronounce the words that you are throwing at us here this morning and I am trying to stop a few of them myself.

So explanation becomes very important and when you begin to use these long terms and the hole in the atmosphere and la-di-da, not many of your constituencies understand it, or do they accept it, because the spray on the hair is real nice instead of pumping it, you know, and they ought to go back to the old days when you could get Vaseline on your hair and make it slick.

What goes around comes around, I think. We did not have all that when I was growing up, so now they are going back to what I had 50 years ago.

When you say on-site recovery and purification, what do you mean by that?

I mean, what do I have to take, what does the dealer have to take, what does a dealer have to do, of all of these things?

Mr. **Hobbs**. Senator Ford, most of the major manufacturers across the world have recognized recovery and recycling. What that entails is a piece of equipment which in essence takes the refrigerant out of a vehicle, runs it through an oil separator, through some filters, through a condenser, condensing it back into a liquid form, and restores it.

Now, these pieces of equipment, in order to be recognized by the Motor Vehicle Manufacturers' Association must meet UL regulation 1963 and SAEJ-1991.

Senator **Ford**. Well, I am not worried about that. You will take it and put it through this process and you purify it and you put the CFCs back into——

Mr. **Hobbs**. That is correct. We put the CFCs back into the vehicle. Before this time, the normal practice would have been to vent it to the atmosphere.

Senator **Ford**. But we are not getting rid of CFCs at all? We are just keeping them. We are purifying them, is that it?

Mr. **Hobbs**. That is correct.

Senator FORD. What happens when you purify them? Do they not create any problems in the atmosphere, or they just do better in the car?

Mr. HOBBS. No, sir. When they are released they are still going to cause the same problem.

Senator FORD. Well, what good does it do—I thought you were trying to get rid of CFCs.

Mr. HOBBS. Mr. Ford, before this, with air conditioning, automotive air conditioning, we have some 25 years of instructing mechanics to take refrigerant, put it in a vehicle, leak-testing it and then venting the CFC right back out to the atmosphere, then repair the leak, so just with recapture alone we take that one step of releasing of CFC into the atmosphere out of the picture—this has been standard practice, we have been taught this.

Senator FORD. So what you are doing now is repairing the refrigerant, capturing the CFCs while you repair it and then you cleanse them, purify them, and put it back in the car?

Mr. HOBBS. That is correct.

Senator BRYAN. If the senator would yield for just a moment, Dr. Watson does have to go to the airport. We thank him very much.

Senator FORD. Doctor, I am sorry I cannot get to you, but I will get to you another time.

Senator BRYAN. Pardon my interruption, Senator.

Senator FORD. That is all right. The space ship is ready.

Dr. MINTZER. Could I say something about the recycling?

Senator FORD. Sure.

Dr. MINTZER. The reason recapturing and recycling is so important for automobiles is that first of all, automobile air conditionings are the largest single use of CFC–12 in the country, and most of the CFC–12 that was used in them in the past escaped to the atmosphere.

If the system as proposed in S. 870 is successfully implemented throughout the country, what it would mean is that we might only pass, in effect, one charge of refrigerant through the vehicle during its lifetime instead of four, or six, or perhaps eight.

Senator FORD. Or use the can, as Miss Cook demonstrated.

Dr. MINTZER. If the current elements of S. 870 are introduced, we will not have people topping off with cans, which themselves leak and are uncontrolled. In fact, in many cases the service station practice has been to open the system to vent the remaining charge, flush, as Mr. Hobbs said, the test material, and then put it back, refill the system.

If care was not taken in the servicing, in many cases because the quality of hoses and fittings were not as high as we use in other applications in this country, the refill charge also escaped, so instead of having one charge to the system for its entire lifetime, you might have several cycles that required refill charges in a year or two.

So we may get as much as a tenfold decrease in the emissions that are causing the problem if these elements of S. 870 are actually implemented.

Senator FORD. Can you do the same thing for home refrigerators?

Dr. MINTZER. You cannot do the same thing for home refrigerators now, but there is another element of S. 870 that addresses it.

That is, most home refrigerators, unlike commercial refrigeration systems, do not have a servicing valve, so when the refrigerator repair man comes, if part of the charge has leaked out, the entire coil must be removed, all of the charge is lost, and it is replaced.

What S. 870 would allow is the introduction in residential refrigerators of a valve that would allow capture and recycle of refrigerators, as is now done with large commercial systems.

Senator FORD. Does it make them more expensive?

Dr. MINTZER. It would probably add about $2 to a $600 refrigerator to put the valve on.

Senator FORD. What is the retrievable, on-site recovery equipment cost?

Mr. HOBBS. The cost right now currently is ranging between $2,300 to $7,000, depending on whistles and bells. The average units that have been approved are going right around the dealer cost of $3,300.

Senator FORD. So that means every service station, almost, is going to be required to have one, or send his customers to somebody else?

Mr. HOBBS. True, sir. However, I would like to point out that many of the service stations currently are buying equipment to service air conditioners that sell for $3,000 and $4,000, and have been since 1974.

Senator FORD. I understand that. There are a few around. What is in an electrical transformer? Is it CFCs, in the oil base?

Dr. MINTZER. PCBs. Polychlorinated biphenyls.

Senator FORD. Let me give you something that bothers me a little bit. Let us talk about halons for a minute. I am sorry, Mr. Chairman, when Dr. Watson left that took my time.

Most safety requirements, say on boats, requires that you have a fire extinguisher on the boat, *x* number of life vests and those sort of things.

I have been very closely associated with our fire-fighters. They are very concerned about the elimination of halon because of its safety role in saving lives. Now, that is the trade-off.

I have a boat, and I have a fire extinguisher, and I take it in and they check it. It has a meter on it that says whether it is good, bad or indifferent.

How are you going to substitute for that? What happens under those circumstances, and what about all the fire extinguishers that are out there? Are we supposed to just let them wear out, or be used and then be replaced?

Miss Cook, if you want to answer that, that is fine. It bothers me a little bit because, you reduce fire extinguishers in nine months in this bill. I mean, halons have to be out in nine months, where you are giving CFCs a lot of time.

Ms. COOK. My understanding is that the bill addresses the halon fire extinguishers at this time only for home applications, residential uses.

Senator FORD. Well, I would say on a boat would be basically the same size.

Ms. COOK. Right. The technical experts are actually looking at the various kinds of extinguishing agents and evaluating them for their effectiveness. The reason that halons actually are being used now in a wide variety of uses is that they evaporate very quickly and they do not leave a mess. It is not only because they are a good fire extinguishing agent. In the home, experts indicate that dry chemical is just as good and that may in fact be true on boats. I am not exactly sure.

Senator FORD. It is difficult to get to a fire with something to throw on it. You might be able to, but if you can point the stream at a fire and circle it, that usually puts it out. It puts a protective cover around the area and then you can get to the fire, particularly with gasoline and other things on a boat, and they are very effective.

I am concerned. Why nine months?

Ms. COOK. My understanding is that nine months is a very short-term, but the idea is to ban the use for an application where we know alternative agents can be used.

Senator FORD. What are the alternative agents that will put a fire out as fast and efficiently as halon?

Ms. COOK. The reports that have recently been published, as most recent as June 1930 by the United Nations Environmental program technical——

Senator FORD. Back in 1930?

Ms. COOK. June 30th of 1989—have analyzed the whole range of fire extinguishing agents for residential applications, and then it in addition incorporated the environmental impact and halon scored the lowest and your portable all-purpose dry chemical scored the highest for residential applications.

Senator FORD. Does it have any propellent in it to put the dry chemical on it?

Ms. COOK. I am sure that it does.

Dr. MINTZER. Or probably CO_2. Can I respond to the second part of your question?

Senator FORD. Sure. I am taking up too much time.

Dr. MINTZER. I do not read the intention of this bill as to take in all of the fire extinguishers that are currently on the market and replace them. Most of the fire extinguishers that you will find in the Halls of Congress and in most public buildings are not halon-based.

What it is saying is, we are not going to sell any more, and the extinguishers that have worked for us for the last 30 years, both dry chemical and CO_2 foam will continue to work for us.

What we will not capture is the ability to shrink a fire extinguishing can from this height to this height because of the particular characteristics——

Senator FORD. It will be much larger and bulkier and instead of having a small, compact fire extinguisher I have got to have one that would be something like this?

Dr. MINTZER. No. I think you might have to have one—well, I am not sure about the size of your boat.

Senator FORD. I just have a runabout. I do not have a yacht. It just has a little motor on the back of it. I try to catch a couple of fish every once in a while, where the cost per pound is not $12.86.

Dr. MINTZER. You should be able to get by with what has been a conventional kitchen fire extinguisher-size unit that sits about this high on the table. Maybe it will not sit this high, but it certainly will not be bigger than the boat.

Senator FORD. I just hate to have to put another one alongside of it like a sidecar to carry my fire extinguisher, because I probably will not do it.

Senator GORE. Will the senator yield briefly on this point?

First of all, I wanted to clarify what the intention of the bill is on this and what the language actually says.

Where applications are required by Federal law, whether it is by the FAA in an airplane or by the Coast Guard in a boat, those extinguishers would be exempt. It is not limited in its application to home use. It has been characterized that way commonly, but it is applicable to fire extinguishers that are offered for sale or distribution that contain halons.

Now, where you have applications that are required by Federal law, which includes most of the larger applications and some specialized applications in planes and boats, there are exemptions specifically written into the proposed law.

I think we need to clarify those, and that is one of the purposes of a hearing like this.

Senator FORD. I just think nine months is pretty quick to tell an industry, at the end of nine months you are through, you cannot produce any more.

Senator GORE. Well, the halon fire extinguisher industry supports this provision. They agree that they are nonessential for these kinds of uses.

Senator FORD. Well, you are going to get testimony this morning that is going to oppose it. I have read it. There is a fire chief out in Oregon that is going to be somewhat concerned about it, so I do not think it is unanimous. I am not trying to be against the bill, I am just asking questions.

Let me throw one out here that I think might concern a lot of us. We are getting ready to have an acid rain bill and we are going to be very concerned about that, and one of our major coal producers has a large amount of chlorine in it—very low btu, very low SO_2, but very high chlorine.

Now, are you going to tell that state and those utilities that use that coal that you are producing a problem here, as it relates to the atmosphere, and there is no scrubber, I think, that is going to—it creates a toxic problem. How are we going to handle that one?

Dr. MINTZER. I do not know the specifics of this particular mine.

Senator FORD. It is not a mine. It is a large area of the country.

Dr. MINTZER. I cannot tell you at this point what the combustion product releases from that coal are in terms of chlorine-creating gases, whether they are gases that quickly wash out of the atmosphere and are not a problem for ozone depletion, which I think is likely to be the case, or whether some of the combustion byproducts are more long-lived.

If you like, I would look into it. I would be happy to.

Senator FORD. I would like for you to, because I come from a coal-producing state that is probably the largest, if not the largest—then number 2—and we do not have that kind of problem in ours, but we have the SO_2.

Dr. MINTZER. I think you have raised another important issue that grows out of the question that Senator Bryan asked to Dr. Watson before, and that is I think we have reached a point now where we no longer have the luxury of treating these environmental issues one at a time, as though we had one atmosphere that had an acid rain problem, we are going to have a one-purpose acid rain bill, and another atmosphere that had a global warming problem and some other atmosphere that had an SO_2 problem.

I think what you are pointing out, correctly, is the most important fundamental change in policy environment, and that is that we have to now look at each of these bills synaptically, in terms of the effects of the policies that we are proposing on all three of these linked problems, because unless we do so we are likely inadvertently to make a choice in acid rain control, for example, that makes the global warming and ozone depletion problem worse, and ignore a change in policy that could make all three problems better. So I would like to——

Senator FORD. This could be as large a problem as some of the others, and it may be something that we are missing.

If it is not true, then it would make my judgment and those of us trying to develop a clean air bill, which has a very large acid rain component, and we are looking at clean coal technology to try to clean up the atmosphere, from what?

Maybe we are not cleaning the chlorine out. Maybe it is going into the atmosphere under these technologies where it does take care of the coal east of the Mississippi and will not take care of the coal west of the Mississippi.

Dr. MINTZER. I would be happy to talk about this some more, but the question about the alternative CFCs that are covered in this bill I think is on the same——

Senator FORD. I understand that, but what I am growing—is that we are here looking at every-day products that are in your bathroom or in your kitchen, and we are here trying to develop something where a utility will burn hundreds and hundreds of thousands of tons of coal at one utility per year and it may be that we cannot see the forest for the trees. We are looking at these things that we can put our hands on, but we are losing something else.

Dr. MINTZER. The difference between the two is likely to be that they are a lifetime in the atmosphere, because unless it is a long-lived atmosphere compound, it does not get up to the stratosphere and do the damage we are talking about.

Senator FORD. I understand, but I think it is something we need to look at. We always rush. We have no policy. Nothing ever works in tandem around here. We are either cleaning up something before we find out how to substitute for it——

Dr. MINTZER. On the question of the environmental soundness of the substitutes, there is one more element to this linkage issue that did not come out that I think is worth pointing out.

If we make a large-scale commitment as a Nation now, in an open-ended fashion, to the HCFCs as substitutes, we may be creating a set of secondary effects for global warming that could prove themselves to be important. In particular, the reason that the HCFCs have shorter lifetimes in the atmosphere is that the presence of a hydrogen atom allows them to break down in the lower atmosphere and has a shorter lifetime, and thus be less dangerous to the ozone layer.

The thing in the atmosphere which causes them to break down is a reaction with a naturally-occurring compound called hydroxyl, or OH. OH is in limited supply. Our emissions from automobiles and other fossil-fuel related activities that release carbon monoxide to the atmosphere remove OH.

If we add large amounts of HCFCs which react also with OH, the result will be a decline in the stock, because OH is the principal sink element for methane. The result of releasing these HCFCs may be to increase the rate at which the concentration of methane grows, thus making the global warming problem worse. So here we have another aspect.

Senator FORD. It is the gasoline problem with automobiles that you are referring to that could create a problem.

Dr. MINTZER. You mean methanol? The methanol story is also related in the sense that it, too, is being evaluated as a clean air issue, ignoring its implications for global warming and ozone depletion, but it is worth talking about because it makes the decision about methanol a little bit more complicated and a little bit more important.

Senator BRYAN. Thank you very much. I think that helps to develop our record.

Just a couple of questions, since we have all kind of exceeded our own self-imposed five-minute guideline.

Ms. Cook, a question to you. What success, if any, are you having as you discuss with industry some of the products that you have displayed here for us in urging them either to forebear, to use substitutes, or to offer some alternatives; or is that the approach that Friends of the Earth is using?

Ms. COOK. We use several different approaches. One is by educating the public about the ozone-destructive nature of some of these products, it increases the pressure on the industry to actually reformulate their product.

Such is the case with Silly String. I think the recent public attention to the ozone problem has pushed this industry to change their product. In fact, I do not have a can that is now reformulated, but my understanding is they are advertising with a positive label that this product is now ozone safe. That is one more reason why it is important to have labels on products.

Senator BRYAN. Are we making some progress, however? I am not suggesting this is the alternative to what Senator Gore and others are proposing, but are we making some progress? May we move concurrently and try to persuade the industry that there are some alternatives that they must incorporate in their products as opposed to the deleterious substances that are being used that create the environmental damage?

Ms. COOK. I think that without the regulation we can have somewhat of a dangerous situation.

I have been aware that the people who are making Dust-Off, Falcon Safety Products, Inc., are starting to reformulate their product, but they are reformulating it with one of the HCFCs that we have talked about earlier this morning. It is still a slight ozone depleter, and, in our view it is an unacceptable application of a substitute chemical in a product like this. S. 870 has this chemical listed, and it would actually extend its ban to now allow HCFC–22 in a product like this.

Friends of the Earth believes that because we really need to minimize the emissions of the substitute chemicals as well, their use should be reserved for very high value applications and applications where they can be recycled.

So I think it is important to both be aware of what the industry is doing but also to set guidelines so that when they invest they invest in an environmentally sound way.

Senator **Bryan**. Mr. Hobbs, just a comment and observation. I would like to compliment you and your organization. As Chairman of this subcommittee, frequently representatives from industry and those who are allied with us tell us we cannot make any change at all or that we constitute such a de minimis part of the problem that you should look to others. I think your approach has been positive, and I would compliment for your testimony.

Mr. **Hobbs**. Thank you, Mr. Chairman.

Senator **Bryan**. Dr. Mintzer, a couple of technical questions, and I know Senator Gore has a couple of additional questions.

I wanted to get an answer, and I think you were about to do so and I cut you off because we thought Dr. Watson had to leave earlier. One part of Mr. Hobbs' testimony which was commented on, and which I think Senator Ford picked up, is the on-site recovery and purification. That would be a change in the provision of Senator Gore's bill.

My question to you is, if from an environmental point of view we accomplish the same result—and I say "if", and that is the thrust of my question—it seems to me to make some sense. Could you comment on that from an environmental point of view?

Dr. **Mintzer**. Yes. The important value to the environment is to reduce the rate at which the long-lived chlorine-containing compounds are released into the atmosphere. If you can accomplish it with on-site recovery and save the transportation cost in the infrastructure and the frictional losses in the system, by all means do it. All that is required is to make sure that the units themselves function to meet the purity standards that ARI and others require so that the basic hardware investment is not lost.

Senator **Bryan**. I am not trying to put words in your mouth, but, if I understand, what you are saying is, look, on-site purification and recovery can work. There is nothing, per se, that prevents it from accomplishing the environmental objective that we seek to achieve.

Dr. **Mintzer**. Yes, and as long as we can accomplish that objective of keeping the CFCs out of the atmosphere, I do not think there is any need to stipulate that they have to go to a central recovery facility; but there has to be a mechanism by which there is regular testing of the ability to trap and recycle on site and to make sure the purity requirements are met.

Senator **Bryan**. Let me give you an opportunity to respond to one more question, and then I will yield to Senator Gore.

Dr. Watson said, in effect, that although he is not willing to give a complete Good Housekeeping seal of approval, as I characterize it, to HCFCs, nevertheless they represent substantially less impact environmentally or it appears that they do at this point. We still have not done all of the research and cannot categorically make those assertions.

My question is that as we push the industry into this alternative for very sound objectives and policy considerations, how sure are we that this is the way to go. Do we get them to gear up and in effect develop product lines that meet HCFC criteria only to tell them a year from now, oops, we told you to go the wrong way, there is another direction?

Frankly, I have seen that happen over the course of a good many years in public policy, not with respect to HCFCs or CFCs but in other technologies.

Could you give us your assessment?

Dr. **MINTZER**. I think the problem that you point out is a real one. It goes back, again, to the issue that Senator Ford raised about acid rain. We have to be careful that we do not give industry signals that are sequential and conflicting. That is why this synoptic approach to these three problems is so important.

On the HCFCs, I think the most important thing to do is to give industry a signal of when we expect that they, themselves, will have to be phased out. I met last week with senior representatives from EPA, from du Pont, from the Home Appliance Manufacturers Association and others to discuss joint approaches to the steps beyond the Montreal Protocol.

The thing that came out of that discussion that was most important was that what industry requires is some sense of what the acceptable lifetime of use for the substitutes is going to be.

If we can say to them now it will be the policy of the United States Government that by 2010 or by 2020 we will require the introduction of a safer line of compounds for these services that do not have a global warming effect and that do not have an ozone depletion potential, they can prepare for that 30-year product life cycle.

If we wait and then tell them they have to phase out in nine months or a year from now or we wait until 2010 and tell them they have to phase out in five years, they cannot do the preparatory work that is necessary.

What they are asking from us and, indeed, from you is some sense of the long-term trajectory of acceptability for these chemicals. I would suggest to you that we begin to think now about phasing out the HCFCs somewhere around 2010 or 2020 so that we move to compounds through a development cycle that is orderly and that is cost effective to compounds that have no ozone-depleting potential, no global warming effect and do not add to the acid rain problem.

Senator **BRYAN**. Dr. Mintzer, thank you very much.

Senator Gore.

Senator **GORE**. Thank you very much, Mr. Chairman.

I want to address this question of on-site versus off-site. Senator Ford raised it, and I think it is an excellent point. You raised it also, Mr. Hobbs, and you picked up on it, Mr. Chairman.

The language in the bill can certainly be read as you all have read it. It is not really intended to be read that way. I think this illustrates how a hearing like this can really improve legislation.

I do not want to bias the approach against on-site recycling. Mr. Hobbs, I think you have done a good service here, because I wholeheartedly approve of on-site recycling, and I will recommend to the subcommittee revisions to the language to ensure that we do not leave any perception to the contrary. It was not intended, and we want to make sure that that is clarified.

You made another point also, Mr. Hobbs, that I think is worth noting. Again, in the tradition of hearing from the people who live where the rubber meets the road, you tell us that a lot of the tanks that people use today to reclaim these chemicals are in the 17 to 25 pound category, and the bill uses the 30 pound limit.

You are recommending that it be brought down to a 20 pound limit, as I understand it. It seems to me that that is a useful suggestion, also.

I want to join with the Chairman in commending your group not only for the approach you have taken in the hearing today but also for being in the lead in advancing technology for on-site recovery and recycling. I really think you all have done a good job on that.

Earlier, Dr. Mintzer, you talked about refrigerators. Maybe it was in response to another question from Senator Ford.

Whirlpool Corp. just announced two days ago the development of a new technology near Kentucky for recapturing the CFCs out of refrigerators in the home, and there are probably some Kentuckians who work in that facility.

Senator FORD. Most of them.

Senator GORE. We will supply for the record, Mr. Chairman, a description of their CFC recovery.

Senator BRYAN. We will make that a part of the record.

Senator GORE. Also, reference was made by Dr. Mintzer to eliminating the full flood testing procedures for halons.

As a Member of the Armed Services Committee, with the help of Senators Gorton, Warner and others, I was able to put in a provision requiring exactly that change where U.S. military operations are concerned. I think that might be yet another useful amendment to this bill, Mr. Chairman. We will consult with some of the other experts and perhaps offer an amendment at mark-up on that provision.

I wanted to make just a couple of other points. In response to the suggestion that we are sort of focusing on some of the little applications and ignoring the big ones, that is not our intent. The automobile air conditioner leakage is the single biggest source of CFCs being introduced to the ozone layer. As the witnesses here have thoughtfully testified, this bill is aimed right at the heart of that particular part of the problem.

I thought Senator Ford's point which provoked Dr. Mintzer's comment about approaching these problems in a related way is a very good one. We do not want to just take separate aspects of the problem and not keep in mind what the other aspects of the problem are as well.

In conclusion on this panel, Mr. Chairman, let me just say that, you know, nine months from now the chemicals introduced will stay there 100 years and nine months from now. We have a collision between industrial civilization and the planetary ecosystem on which life as we know it depends. We have seen a tripling of the world's population in the last 75 years, and it may triple again in the next 75 years.

The impact of each of the additional billions is magnified by chemicals like CFCs and emissions of carbon dioxide and methane and other substances. We are literally changing the earth's environment.

If we cannot address the frivolous uses of the most harmful chemicals, if we cannot face up to the aspects of the problem that we in the most advanced industrial nation in the world are causing and can change without any harmful effects to our lifestyle, then the prognosis would be bleak indeed.

I think we can face up to it, and I think this is the place to start. By facing up to it, we will add to our moral credibility in the United States and enhance our ability to lead the rest of the world toward a better Montreal Protocol that actually does the job, toward a global convention on greenhouse emissions, and address related aspects of the problems like deforestation and species loss and all the other things we do not have time to get into today.

I really appreciate your having this hearing, Mr. Chairman. I know we have a vote on in another panel, so I am going to quit.

Senator **BRYAN**. Thank you very much, Senator Gore. We appreciate your leadership on this subject as well.

To the panel, thank you very much. We were a bit truncated in our approach this morning. We apologize for any inconvenience that may have been caused to each of you, and we thank you for your testimony and your comments.

We will call the next panel at this time but make you aware of the fact that we have to race over for a vote. We have Mr. Olin Greene, Fire Marshal, State of Oregon, on behalf of the National Association of Fire Marshals;

Mr. Jerry Stofflet, Assistant Director, Automotive Emissions Control, General Motors, on behalf of the Motor Vehicle Manufacturers Association;

Mr. Robert M. Gants, Vice President, Government Relations, Association of Home Appliance Manufacturers; and

Mr. H.B. Wilder, President of Igloo Products, on behalf of the Automotive Refrigeration Products Institute.

Gentlemen, we will be back with you as soon as we possibly can. Again, the panel apologizes for any inconvenience caused by reason of the delay. We will be hearing from you shortly.

[A brief recess was taken.]

Senator **BRYAN**. The subcommittee will reconvene with once again extended apologies to the witnesses for the interruption that we've had.

Mr. Greene, we will begin with you, sir.

STATEMENT OF OLIN GREENE, FIRE MARSHAL, STATE OF OREGON, ON BEHALF OF THE NATIONAL ASSOCIATION OF FIRE MARSHALS

Mr. **GREENE**. Thank you, Mr. Chairman, and members of the subcommittee. My name is Olin Greene, and I am the State Fire Marshal for the State of Oregon. I am also Chairman of the Legislative

Committee of the National Association of State Fire Marshals, which represents top fire officials at the state level.

I appreciate the opportunity to appear before the Consumer Subcommittee of the Commerce Committee today to express my views on S. 870, the Consumer Ozone Protection Act.

My remarks today will focus only on section 6 and slightly on section 10 of the bill which states fire extinguishers for consumer applications within nine months after the date of enactment of this act, "No persons shall sell or distribute or offer for sale or distribution in commerce fire extinguishers that contain halon or other ozone-depleting substances listed under section 10 of this act, except for applications required by federal law.

If enacted, S. 870 would outlaw the use of all—apparently would outlaw the use of all fire extinguishers utilizing halons as extinguishing agents, not only residential extinguishers but others as in section 10 relates to halon 1301 which deals with systems, and there are no commercial hand-held extinguishers utilizing 1301 halon. And this ban would go into effect nine months after enactment.

I would urge you not to prohibit the use of halons for fire protection purposes until such time as an environmentally acceptable substitute is commercially available.

There are serious fire and life safety consequences to this prohibition which I would like to point out to the subcommittee members. Other segments of the fire service and volunteer fire fighter organizations have taken similar positions with regard to a tax on halon, which could have the same effect as the outright ban that is proposed in S. 870 and copies of that document outlining their positions are attached to my statement.

Halons are unique chemicals, and their sole purpose is to extinguish fires. They protect lives, specialized equipment and military hardware. They are literally lifesaving chemicals. There are no known substitutes at the present time having the same fire fighting attributes, though a public-private research consortium led by the federal Environmental Protection Agency is diligently searching for a suitable alternative.

Any attempt to eliminate halons from the marketplace at this time would compromise fire safety. The critical need for halons caused our organization last month to adopt a resolution—and I would quote—"Federal and state policy should encourage the development of safe and effective alternatives to halons, encourage reductions in unnecessarily halon discharges, but should in no way seek to further restrict the supply of halons until safe and effective alternatives are commercially available." And also, I have attached a copy of that resolution that is incorporated in that statement.

The Honorable Curt Weldon, Chairman and founder of the Congressional Fire Service Caucus, and a man that is respected nationally for his dedication to fire protection recently cautioned all members of the Congress that the elimination of halons from the marketplace would yield relatively little benefit to the environment and would leave critical facilities and equipment without necessary fire protection.

Congressman Weldon's letter dated September 5, 1989, makes a number of valid points which I urge the subcommittee to consider before voting to ban the use of the halon for fire extinguishment before a suitable alternative is found.

Who are the users of halons? The military purchases about 30 percent of all halons produced, and they use it widely in planes, ships, and tanks. The FAA requires all commercial airliners to have halon 1301 systems in every jet engine and laboratory and a portable halon 1211 system in the aircraft cabin.

Halon protects the Bill of Rights, Mount Vernon, the Smithsonian, the National Archives, and I understand the President's limousine from fire.

Companies are using halons to protect sensitive computer and communication operations, merchant vessels, hospitals, museums, oil pipelines, and various other commercial and industrial applications.

The Congress uses halons to protect its communications and data processing facilities. In fact, again, I understand the computers in room B-79 and B-85 in the Russell Building are protected by halon 1301 systems.

Halon often protects people. A New York City Transit worker recently was saved by halon after a fire bomb was thrown at his turnstile booth during a robbery attempt.

The Montreal Protocol, which the United States and over 40 other nations have ratified, recognizes the unique attributes of halons as opposed to CFCs. The protocol calls for reduction, not elimination, of these products mandating a production cap of halon at 1986 levels beginning in 1992.

This distinction has been drawn because of the fire fighting effectiveness of halons, the scientific uncertainty about halons' role in the ozone depletion, and because of the vast differences in production levels between CFCs and halons.

On the last point it is important to note, as Senator Gore brought out, that we may be commenting on the smaller objects in this bill, but it points out that halons may make very little difference in the big picture.

In 1989 about 700 million pounds of chlorofluorocarbons were produced as compared to about 18 million pounds of halon. Of that 18 million pounds, 15.3 million pounds will be held in reserve to fight future fires. 1.8 million will actually be used this year to extinguish fires and less than 1 million will be released due to training, testing, and accidental discharge, a number that many of us are attempting to reduce by using inert gases for testing and for training.

Industry members are working in voluntary cooperation with the EPA, the military and other government officials to speed up the development of a commercially viable alternative to halon. Safe and effective replacements for halon are being sought and are expected to be discovered.

However, until that time, I would urge the subcommittee to reject any ban on the production or use of halon until such time as a suitable alternative is available for use by those of us who have a critical need for such protection.

Thank you for the opportunity to present these views, and I would be happy to supply any additional information.

Senator BRYAN. Thank you very much, Mr. Greene.

Mr. Stofflet, we will hear from you now, sir.

STATEMENT OF GERALD F. STOFFLET, ASSISTANT DIRECTOR, AUTOMOTIVE EMISSION CONTROL, GENERAL MOTORS CORP., ON BEHALF OF THE MOTOR VEHICLE MANUFACTURERS ASSOCIATION

Mr. STOFFLET. Thank you, Mr. Chairman and members of the subcommittee. I am Gerald Stofflet, representing the Motor Vehicle Manufacturers Association of the United States [MVMA], the trade association of companies that manufacture 97 percent of the cars, trucks and buses built in the United States.

The members of the asssociation are committed to replacing chlorofluorocarbons, CFCs, in their products and processes as expeditiously as safe substitutes become available.

Because no direct drop-in substitutes exist for any of the CFCs controlled under the Montreal Protocol, every product or process currently used or made with a controlled CFC has to be redesigned to use a new substitute material.

With regard to legislation under consideration in this hearing, MVMA fully supports the goals of S. 870, the reclamation and recycling of CFCs.

MVMA members have a few concerns we would like to see addressed, but before mentioning those, let me tell you what MVMA members are doing to reduce the use of CFCs.

Automotive air conditioning systems universally use CFC 12 as a refrigerant. FC–134a, the leading replacement refrigerant candidate requires development of a new lubricant, a commercial manufacturing process, plus completion of toxicity testing, all of which are underway.

Quantities of FC–134a should be available for additional testing in late 1990, but complete toxicity tests will not be completed until the fall of 1992. Although the short-term inhalation tests were encouraging, there would be some risk to phase in FC–134a before testing is completed.

Meanwhile, some field testing is ongoing to verify durability and proper operation of the system with the new refrigerants. Once the designs are proven, domestic full line manufacturers must each modify up to 28 different systems which is significantly more than foreign limited line manufacturers.

Domestic manufacturers typically release models for production tooling three years in advance. Thus, 1993 models will have been released by about the end of 1989. Consequently, the phase in of FC–134a refrigerant mobile air conditioning systems will not likely start until the 1994 model year, which is the fall of 1993, with complete phaseout of CFC–12 in new vehicles completed in about three to five years.

In the meantime, MVMA members fully support recycling and reclaiming CFC–12 refrigerant during the servicing or disposal of the mobile air conditioning system. Vehicle manufacturers have actually worked with the government, other individuals and organizations to develop standards, procedures, and equipment specifications for the recycling and reclaiming of mobile air conditioning refrigerant CFC–12.

Underwriter's Laboratories certified designs have just been approved, and equipment manufacturers can now begin to supply recycling equipment.

My company, General Motors, is undertaking a program to encourage recycling of CFC-12 whenever existing air conditioners are serviced. On August 2nd of this year we announced that the recycling recovery machines will be made available to GM dealers starting in the current 1990 model year.

This machine will be a required service equipment in all dealerships, assembly plants and GM fleet garages where A/C repairs are performed starting in the 1991 model year, which is the fall of 1990.

MVMA members have stated they plan to eliminate the use of CFCs as blowing agents for foam products and as a solvent in parts degreasing by the end of the 1993 model year for most applications providing safe substitutes are found.

Although an acceptable substitute for CFCs used as a cleaning solvent for electronic parts and precision metal parts such as fuel injectors has not been found, intensive investigations continue. That effort is also trying to avoid considering methylchloroform and carbon tetrachloride as replacement solvents due to their possible inclusion on the controlled material list under the Montreal Protocol.

With regard to S. 870, MVMA members believe some areas in the bill as drafted need clarification. These areas are presented in our written statement. An example is the definition and use of the term "recapture equipment" in sections 4 and 5, which has been brought to your attention before.

The bill needs to recognize that the recycling equipment MVMA members expect to use in their servicing facilities, and dealerships, will be capable of purifying the CFCs on site rather than sending them to recycling facilities.

Concerning Federal preemption, stratospheric ozone depletion is a global not a local phenomenon. However, numerous state and local governments have introduced legislation or regulations concerning the use and recycling of CFC-12 as a refrigerant in automotive air conditioners as well as other uses of controlled CFCs within their state.

Governmental action at the Federal level is the most appropriate and effective way to respond to the need for CFC regulations within the United States in order to provide uniformity and prevent the creation of an inconsistent, potentially costly and needlessly complex system of regulation.

MVMA member companies therefore urge Federal preemption of state authority to regulate CFCs.

In summary, MVMA member companies are active participants in reducing the release of CFCs in our environment. We are working as fast as technology will allow to replace CFCs in our products and processes.

MVMA appreciates the opportunity to present its views. Thank you.

Senator BRYAN. Mr. Stofflet, we thank you.

Mr. Gants.

STATEMENT OF ROBERT M. GANTS, VICE PRESIDENT, GOVERNMENT RELATIONS, ASSOCIATION OF HOME APPLIANCE MANUFACTURERS

Mr. **Gants**. Thank you, Mr. Chairman.

I represent the Association of Home Appliance Manufacturers, the industry trade association that represents the manufacturers of virtually all refrigerators, refrigerator freezers, and freezers and room air conditioners sold and manufactured in the United States.

Refrigerators and freezers use CFC–12 as the basic refrigerant gas. There is about six ounces in each unit, and they use CFC–11 as a blowing agent for foam insulation. They use about two pounds of that in each unit.

Room air conditioners use HCFC–22 as the basic refrigerant gas from 16 ounces to about 30 ounces, depending on the size of the unit.

HCFC–22. as you know, has a much lower ozone-depletion potential than CFC.

This industry only accounts for about 4 percent of the total free world CFC use, and use of CFCs are essential for our products to function at this time.

Although they are essential, we do support the orderly phaseout of CFCs–11 and 12 and the introduction of safe, reliable, and energy-efficient alternatives. And I emphasize the need for energy-efficiency.

To that end we are working on minimizing the escape of CFCs during appliance manufacturing, identifying safe and effective means to prevent CFC–12 from being released into the atmosphere during servicing, and we support the development of waste management systems to prevent release into the atmosphere of both 11 and 12 during disposal.

To underscore our commitment to finding safe alternatives an industry, government, a technological partnership was recently formed. It's called the Appliance-Industry-Government CFC Replacement Consortium, Inc. It is funded by seven refrigerator manufacturers, and its goal is to identify safe, reliable and energy-efficient replacement candidates so that refrigerator manufacturers can stop using CFCs in production as soon as possible.

Turning to sections of the bill, regulated substances in particular, I would like to point out that the use of certain of the substances proposed for regulation under the bill, particularly those under section 10b may be relatively desirable in use, at least for the next few decades, compared to other substances or technologies.

At the same time that CFC refrigerants and blowing agents are being phased out because of the depletion of the ozone layer, refrigerator design will be impacted by another environmental concern, global warming.

The energy consumption of refrigerators contribute to increased emissions of carbon dioxide by fossil fuel power plants. Carbon dioxide, as you know, is a major contributor to the greenhouse effect.

Therefore, public policy may best be served by preserving the use of substances which enhance the energy efficiency and utility of these products, particularly since these products use closed, sealed systems.

An EPA draft report on the future growth and demand for HCFC states, "Of the options evaluated as CFC replacements, those applicable to the residential refrigeration end use represent the best opportunity for reducing greenhouse warming and energy use."

We may have no other choice in the foreseeable future but HCFCs if we are to meet both federally mandated, stringent energy standards and phase out CFCs at the same time. In short because of the high energy use and relatively low emissions from refrigerators, HCFCs may be a better tradeoff environmentally over the next 20 to 30 years compared to less efficient CFC alternatives.

We, therefore, recommend limiting the scope of the bill to those consumer products covered by the Montreal Protocol.

The labeling requirement gives us a great deal of trouble. We strongly oppose it. The purpose of a label in our estimation is to permit the consumer to make an informed choice. Today the technology does not exist to manufacture non-CFC refrigerators that also meet applicable safety and energy efficiency requirements. In short, there is no consumer choice. The label serves no other purpose than to denigrate the industry.

It is unfair, we think, to impose punitive provisions on the industry. We full expect that when CFC-free refrigerators are technologically feasible, they will be rapidly introduced into the marketplace. At that point the consumer would have a choice but the need for labeling would, be moot.

The refrigerant substance and total charge of the refrigerant used in refrigerators and freezers and in room air conditioners are currently already on a label affixed to the serial plate of the appliance.

I am confident that in a free market system CFC-free refrigerators would be able to compete against refrigerators that use CFCs for the consumer's dollar without the need for a federally-mandated label pointing out the difference.

With regard to reclamation, section 9 of the bill directs the Secretary to issue a reclamation plan. I want to point out that we know of no acceptable way to recycle CFC foam insulation; that is, the insulation in the refrigerator blown in with CFC-11.

In addition, the requirement for the consumer products to have an aperture gives us trouble. We think it is unnecessary and could increase the risk of CFC leakage from the sealed system

Present refrigerator and freezer systems are hermetically sealed, and the service repair incidence are estimated at less than 1 to 2 percent on in warranty units and less than 1 percent on out of warranty units.

My statement says 5 percent over an average 15-year life, which is excessive. It is actually about 3 percent.

We recommend that the aperture requirement be removed to allow manufacturers and others maximum freedom to develop recycling and reclamation systems for appliance CFCs.

It was pointed out earlier that Whirlpool Corporation has announced a system to recycle—to recapture and recycle CFCs. I believe it is recapture them. I am not sure they are recycling them. But the point is, that is on current product without need for an aperture.

Again, the more connections, the more joints, the more things you put on the sealed system, the greater the chance for leakage.

In conclusion, I appreciate the opportunity to provide you with our concerns over the bill. We are committed to and are investing considerable resources to find safe, reliable energy-efficient substitutes for CFCs.

We will work with you to develop a federal program to encourage CFC reclamation that will not unduly burden consumers and industry and will protect the environment.

I see my time is up, but I would like to, perhaps at the question period, expand a little bit on the technological problems that we face in our industry on recapturing CFCs. Thank you.

Senator **Bryan**. Thank you very much, Mr. Gants.

Mr. Wilder, perhaps an apology is due to you. I think I described you as the President of Igloo Products. I am looking at your prepared testimony. Is that pronounced IG–LO?

STATEMENT OF H.B. WILDER, IG-LO PRODUCTS, ON BEHALF OF AUTOMOTIVE REFRIGERATION PRODUCTS INSTITUTE, ACCOMPANIED BY CARL STRATEMEIER, PRESIDENT, AIROSOL CO., INC.

Mr. **Wilder**. It is IG–LO.

Senator **Bryan**. All right. I was right the first time. Thank you. Please proceed.

Mr. **Wilder**. Thank you very much, Mr. Chairman.

I am President of IG–LO Products; however, today I am representing the Automotive Refrigeration Products Institute [ARPI]. I am chairman of ARPI's Committee on Environmental Affairs. I am accompanied by Carl Stratemeier behind me, who is President of Airosol Company, Inc., also a member of ARPI. Carl and I would be happy to respond to any questions you may have.

ARPI is a national organization of producers, container manufacturers and packagers of automotive refrigeration sold in small cans and larger cylinders. Our members provide the automotive aftermarket with their refrigerant. We represent a broad cross-section of the industry, including both large and small business.

I am pleased to be here today to offer ARPI's comments on S. 870, the bill introduced by Senator Gore. ARPI is supportive of the scheduled phaseout of ozone-depleting chemicals pursuant to the Montreal Protocol as implemented by the Environmental Protection Agency in its August 1988 rulemaking. We also support efforts to accelerate this phaseout and encourage the development of non-CFC substitutes. Our membership includes companies that are actively involved in the development of ozone-friendly refrigerants.

ARPI submitted comments for the record on S. 870 to the Environment and Public Works Committee in May of this year. Since then, several significant developments have occurred that have, to some extent, recast the debate relative to mobile air conditioning issues.

First and foremost among these is the progress industry has made on a voluntary basis toward the development of reclamation and recycling equipment and other devices that will make refrigerant use more environmentally safe.

The Environmental Protection Agency has acknowledged this progress and commended the industry on its recognition of the need to address refrigerant misuse and the problem of CFC emissions from auto air conditioners.

We believe that the market forces set in motion by the Montreal Protocol are responsible in part for industry's response to the CFC issue and are driving speedy implementation of recycling and development of substitutes for ozone-depleting chemicals.

We are supportive of Federal legislation that truly enhances the protocol. ARPI believes that Federal legislation or regulation is far preferable to patchwork State legislation because of the likelihood of inconsistent and conflicting requirements in each state.

We currently are working with the EPA and others to explore workable regulatory programs to address the problems associated with auto air conditioning and use of CFCs. ARPI believes that any Federal legislation should be coordinated with the EPA's efforts. With this in mind, we offer the following comments on the bill.

We believe pending legislation such as S. 870 should be reexamined in light of the new climate of industry progress and ongoing discussions with the EPA and all interested parties. This might necessitate substantial revisions to pending bills, but if the goals of the legislation are to end dependence upon CFCs and transition this country from ozone-depleting chemicals to non-CFC substitutes, it would be counterproductive to put statutory mandates in place that would, at best, be duplicative and might derail progress already being made.

For example, we feel the deadlines stipulated in S. 870 are extremely unrealistic. If anything, the deadlines assure that big businesses remain big and eliminate small entrepreneurial companies that have shown the most progress toward developing innovative solutions to the problems posed by CFCs.

S. 870 would give primary authority for oversight and administration of its mandates to the Department of Commerce. ARPI sees no need to shift regulatory oversight from the EPA to the Department of Commerce since EPA is already well along the path of addressing CFC issues.

ARPI enthusiastically supports reclamation and recycling of CFCs and applauds Senator Gore for including the concept in S. 870 of allowing reclamation on site of CFCS with recycling at local or regional recycling centers. The Gore Bill would encourage faster acceptance of reclamation by service professionals and allow greater flexibility in the service sector. This would have positive implications for servicing refrigerators and stationary air conditioners as well as autos.

To clarify, we do not believe it is an argument between on site and off site. Having the flexibility creates the opportunity for reclamation and recycling to permeate the marketplace much quicker. Small volume shops who might have two or three locations could reclaim at one location and recycle at another. Farmers might have the opportunity to reclaim and transfer to a recycling center.

On the container issue, S. 870 would prohibit the sale of CFC–12 in containers smaller than 30 pounds. This is designed to eliminate the sale of refrigerant in 14 ounce cans, currently the container of choice for a majority of the trade sector as well as consumers who service their own auto air conditioners.

A great deal of misinformation has been circulated about the 14 ounce can. This has led to misguided efforts at the State and Federal level to ban the can. ARPI believes and has market data to prove that such indictments of the can are unfounded. In states where ARPI has actively opposed can bans such as Maryland, New York and California, we have been successful in convincing legislators that the container is not the issue. It is the contents and how those contents are used. Banning the can to address the problem of CFC-12 emissions is analogous to banning baggies to eliminate the Nation's drug problem.

We believe we have reached consensus with the EPA that time and effort have been wasted on efforts to ban the can when the real challenge lies in educating users about the proper use of refrigerant, be it in small cans or large cylinders. EPA has acknowledged that major reductions in CFC emissions from auto air conditioning will occur when consumers and service professionals are informed about the problems with CFCs and the necessity for conservative use, recycling and eventual phaseout.

We view the can as environmentally friendly for the delivery of refrigerant for the following reasons:

The can is not incompatible with recycling;

The can is ideal for controlling volume for precise fills to augment reclamation, recycling and recharging equipment that may not be capable of dispensing precise fills;

The can is a crimped, tightly sealed container that is resealable; and

The can may well be the most desirable size container for blends with far less ozone-depleting potential according to some members of our organization. Banning the can may delay introduction of desirable blends.

EPA appears to agree with ARPI that an immediate ban on the can before reclamation and recycling has fully penetrated the marketplace might well result in an increase in emissions. This is because the largest source of the CFC emissions is attributable to the service practice of venting the entire contents of the air conditioner to the atmosphere prior to servicing.

By contrast, consumer use of the can accounts for less than 2 percent of all CFC emissions according to the EPA estimates. A can ban would force consumers to take their vehicles into professional service shops, thereby increasing emissions at least until all shops have and use recycling equipment.

ARPI is concerned about provisions of S. 870 to accelerate the phaseout of substances not currently scheduled for elimination such as HCFC-22. We are afraid that these provisions might severely impact the development of blends with far less ozone-depleting potential than CFC-12 and thus impair efforts to make an orderly transition from CFCs to non-CFCs.

Instead of focusing on the size of the container, S. 870 should address the need for public education and user training. The bill addresses only half of the problem by omitting an education component. Without educational efforts, refrigerant misuse can and will occur in every user group, no matter what regulatory mandates are in place or how much equipment is purchased.

ARPI intends to contribute to this user education process. We are now developing programs to be in place during the next service season. Our message will be bold, simple, and clear: If it leaks, fix the leak. Do not vent. Recycle and reclaim. Use all the contents of the container prior to disposal.

We as an industry are committed to consumer education, CFC conservation and other measures to eliminate the greatest degree possible of CFC emissions and facilitate the transition to non-CFC refrigerants.

ARPI is working closely with the EPA to explore the utility and feasibility of a regulatory program for mobile air conditioning. We believe the leadership demonstrated by Senator Gore and others has intensified the focus on efforts to conserve CFCs, eliminate emissions and develop substitutes.

We thank the subcommittee for the opportunity to testify.

Senator BRYAN. Thank you very much, Mr. Wilder.

Just a couple of observations generally to the panel. You have heard the testimony, as we have, in describing the severity of the problem, its dimensions and its long-time impact.

What we are being told here today is that those emissions that contain chlorine concentrations will be a part of the ecosystem a century from now. That is three generations. So I must say that testimony that says "we really have a de minimis impact" I do not find terribly helpful or constructive. I, speaking as one Senator, appreciate the efforts that the industry has undertaken to address some of these problems responsibly and to help us to move that timetable as rapidly as we possibly can.

As to the comments expressing some reservations about regulating HCFCs, the testimony is pretty clear. If you object to it in terms of factual disagreement, please share that with us. HCFCs are not a Utopian solution. As I understand the testimony this morning, it is far better than CFCs, but we need to look to the point when we eliminate HCFCs as well and develop a new technology.

So clearly, it strikes me that industry needs to understand that, and it is not unreasonable to include HCFC regulations as part of this bill as well.

Let me ask specifically, Mr. Greene, your concern about halons. I want to be clear that your understanding of the state of technology is that there is no substitute.

Mr. GREENE. Senator Bryan, there are several different types of fire extinguishing agents. One of the others that is listed there, carbon tetrachloride, used to be used for a fire extinguishing agent. It was eliminated several years ago.

There is dry chemical. There is water. There are foams. There are several different types of agents. My comment or my statement was there was no known fire extinguishing agent such as halon for its particular application. Some of those applications are in large computer rooms, protection of oil pipelines, areas where they leave little or no residue, act rapidly and extinguish a fire rapidly.

Senator BRYAN. Mr. Greene, you have heard the testimony that although halons may represent a relatively small proportion, they are particularly damaging in terms of what they do to the atmosphere. Those of us who are policymakers have to make some policy judgments, and your testimony is helpful to build a record here.

Is there nothing else in your judgment at this time that can be used in lieu of halons?

Mr. GREENE. Senator Bryan, certainly our organization is not insensitive to the needs of the protection of the ozone either. At this particular time, we know of nothing that is suitable for the protection of those areas such as halon. What we are asking for is not a continuation of the halon but to continue until an alternative or a substitute can be found.

Senator BRYAN. You appreciate the dilemma that that causes us? I am not saying that that will not be the judgment of this subcommittee if the bill is processed, but by allowing it to continue indefinitely we continue to aggravate the problem environmentally. You heard the testimony.

One point on which I think there may be some common ground based upon your testimony and the observations made earlier is the way in which it is tested; that is, alternative means of testing rather than venting halon through the system and permitting it to escape.

Is there not at least some agreement on that issue? If I misunderstood the testimony or the position, please correct me, Mr. Greene.

Mr. GREENE. Senator Bryan, I agree with you totally. I think a lot of that has to do maybe with some of our errors in the past in not recognizing the problems that halon had been creating. Ours is an education aspect of our own people to not require a full-scale dump test, if you will, of a halon on the installation of a system but the dump test of another inert gas other than the halon, saving the halon for the actual fire extinguishing purpose.

Senator BRYAN. Do you object to statutory provisions being incorporated in the bill to that effect?

Mr. GREENE. No, sir. In fact, I would encourage that.

Senator BRYAN. Thank you very much, Mr. Greene.

A question for you, Mr. Stofflet, on the CFC–12 phaseout, the onsite recovery, the purification.

You indicate you are putting that kind of equipment into the GM distributorships in the 1990 model year?

Mr. STOFFLET. We are making it available in 1990, and it will become required equipment for model year 1991, which begins in the fall of 1990.

Senator BRYAN. I sense an urgency here, Mr. Stofflet, in the sense that what we do today prevents problems several generations down the line. Although these time lines have to be reasonable. I happen to come from a background working at the State level with arbitrary Federal intervention and unrealistic and unreasonable time constraints and guidelines, and I am very sympathetic to that argument. I have railed against that in a former life many, many times.

On the other hand, if you can make this available, using your words, but not requiring it until the next year, why not make it a requirement the same year that it is available?

You leave the impression, sir, that it is kind of discretionary with the dealer. Maybe I do not understand what you are saying.

Mr. STOFFLET. You heard, sir, that the automotive industry did work with a lot of organizations to get these machines to the level that we thought would purify it without bringing it back to virgin material.

Those machines have just been certified as of, I think, August or September of this year with UL. The manufacturers of those machines now are starting to gear up to manufacturer them and get them out.

There are approximately 200,000 to 300,000 service shops that do air-conditioning engine work or new car dealerships. We are licensing through our own tool distributor to make these machines for our dealers, and that is the reason. It is just a matter of logistics and capacity to get them out there fast enough, sir.

Senator BRYAN. I appreciate that explanation. I suppose that you would earn a gold star with some of us for requiring use as it becomes available rather than just relying upon the 1991 criteria.

It seems to me that industry leaders, of which you have an opportunity to be one, may require these earlier if they become available 6 months before model year 1991 because of an increased availability that may be beyond the projections that you have now. You may require it as soon as it is available rather than just saying the law does not, or regulations do not, require it until 1991.

I think what I am trying to do is impart a sense of urgency, that we ought to move as quickly as we can. I am reluctant to enact some statutory criteria that are unreasonable. On the other hand, I do not want industry to coast and say, well, the law does not require us to do it, therefore we can stall it for another 6 months, when indeed there may be a product that ultimately is going to be used and required by 1991 that could be required sooner.

Mr. STOFFLET. Again, the fall of 1990 was the earliest date we had considering the capacity we had to equip all our dealers.

The other part of it is that we have had discussions with EPA, and it looks like about 2½ to 3 years to get everybody a piece of equipment.

You may ask the Murray Corp. They probably know. The manufacturers are getting a lot of orders for overseas places, too.

Senator BRYAN. I appreciate that.

Thank you so much. My time is up, and I will yield to Senator Gore.

Senator GORE. Thank you very much, Mr. Chairman. You have covered some of the ground that I had started out to cover here and did it very well. Let me just fill in a few spaces here.

First of all, Mr. Greene, we did not get your statement until today, and my staff was on the phone with you last night. We have tried to clarify exactly what is intended here in the bill and I thought we had done so, but let me just state for the record that we are not trying in this legislation to ban halons in applications that are commercial and industrial.

For example, we would not ban halons from computer facilities and industrial sides. We are speaking to the handheld fire extinguishers primarily for home use, and we are attempting to eliminate the full flood testing procedures that account for such a large proportion of the halons released into the environment presently.

I think we should amend the bill, which is before the subcommittee, to explicitly cover the testing procedures. And I welcome your statement of support for that move.

I also think, after hearing your testimony, that we need to clarify the language to make it explicitly clear that we are not attempting to ban the industrial uses where the releases can be strictly controlled and where there is presently no substitute available.

But echoing the chairman's comments, I wish to counter any impression you might have left that this is merely a de minimis problem.

Your statement gives the amount of production of chlorofluorocarbons, and then the amount of production of halons. You give the amount of release of halons, but not the amount of release of CFCs.

If one calculates the amount of the CFC production that is released in any given year, and then compare that figure to the amount of halons that are released, and then multiply the halon figure by the extra ozone-depleting potential, which, in the case of halon 1301, is 10 times greater than the worst of the CFCs, then one gets a figure that is almost one-tenth of the damage that CFCs do to the ozone layer.

Moreover, the lifetime of halon 1301 is 110 years, so this is not a de minimis matter at all. But I think that some of the suggestions you have made can well be incorporated into the legislation. And the final product may still not be to your complete liking, but I think that, as the chairman said, some action here is absolutely essential.

I would note also that I am a co-chair of the fire caucus here in the Senate, and certainly have deep concerns about maintaining our ability to have an effective fire prevention and firefighting capability.

Senator BRYAN. I apologize to the panel. I have a meeting with the majority leader, and Senator Gore has agreed, most kindly, to conclude the hearing.

Thank you very much for your testimony. We appreciate it.

Senator GORE. This meeting may be to get the bill scheduled for action.

Now, everybody that comes up here to talk about this problem has, as the first line of defense, well, we are just a small part of the problem. Well, every use is only a small part of the problem. And we have to deal with the problem as a whole.

One of the witnesses today said that—and I believe it was Mr. Gants 'statement—here it is, oh yes. You are only 4 percent of the entire free world. Is that a de minimis use, 4 percent of the entire free world's usage?

Mr. GANTS. If I may respond, Mr. Chairman. That was leading up to the point that, considering the manner in which it is used, and considering the synergistic problem that the protection of the ozone layer has with global warming and has with energy efficiency, the use of CFCs, and HCFCs in their place, by this industry in a closed, sealed, energy efficient system may be more appropriate because of the energy efficiency requirements and because of the then avoided CO_2 emissions, than not using it.

It is certainly not de minimis.

Senator GORE. Well, I just wanted to make sure that you did not feel that 4 percent of the entire free world's usage is a de minimis use. I mean, this is a very important part of the problem.

Now, in your statement, were you the one that also said that labeling would denigrate your product?

Mr. GANTS. Yes.

Senator GORE. Why would it denigrate the product to tell consumers that the chemicals it contains have this potential for destroying the ozone layer?

Mr. GANTS. I do not believe that is what the proposed language says. I believe it goes a great deal further than that.

We would have no objection, I do not think, to labeling the product in conjunction with, for instance, the Federal Trade Commission required energy efficiency label, which costs us hundreds of thousands a year to place on a product. We probably would have no objection saying that this product contains a substance that is federally regulated and may deplete the ozone layer.

Senator GORE. Well, what the label would say is that the product contains and that it inserts the substance which destroys the Earth's protective ozone layer, and then it outlines exactly why that is harmful.

What is wrong with that?

Mr. GANTS. Well, perhaps it is the outlining as to exactly why that is harmful, when there is no other choice, that we take some exception to.

Senator GORE. Well, should not people know about it?

Mr. GANTS. I believe people do know about it.

Senator GORE. I do not think they know which products do this and which products do not. I mean, if I was in your position and made such products, I guess I could understand why I would not want people to know that my product had that consequence.

Mr. GANTS. No, that is not the point, Mr. Chairman. The point is that your piece of legislation requires the Consumer Product Safety Commission to institute an entirely new regulatory system to produce labels to go on refrigerators that say that they contain CFCs. They already say they contain CFCs.

We have gone very public, with your help by the way, in pointing out that we are getting out of using CFCs. We have got a research consortium to find substitutes. There is no other choice for the consumer now. He either buys a refrigerator or he does not buy a refrigerator. There are no CFC-free refrigerators.

Now, if it is necessary for the Federal Government to mandate a label to let consumers know that there is CFC in a refrigerator, then I would suggest that it be a label to that effect, and not one that is of a scary nature. And I would suggest that we do it in a manner that is efficient and cost effective.

For instance, we now label, under the Federal Trade Commission rules, for energy efficiency. Every refrigerator has an energy efficiency label on it. And if it is necessary to put another label on it, why not put it on the same label?

Senator GORE. Well, you said in your statement—I mean, I just disagree with you—you said in your statement that the only purpose of a label is to facilitate a choice. And I just disagree strongly with that. Because another extremely important purpose of a label is to serve notice that the product containing these chemicals has to be disposed of properly and carefully when the consumer is finished using it. And that is not done today.

And people need to be on notice that these things have to be handled carefully. And I am surprised that you would be troubled by this, because indeed the industry is looking for alternatives, but you are continuing to put these chemicals into the environment.

These are the most dangerous chemicals that we presently know of, because of the harm they are doing to the entire Earth's ecological system.

Now, ironically, they were first used because the industry tested thoroughly and found them to not have any occupational safety hazard; they are harmless to the workers when they touch them; they do not interact chemically with the environment at ground level. But it is precisely that quality which allows them to float up to the stratosphere and do the harm we now know about.

So, I sympathize with the industry's plight because they were originally chosen for what seemed like a good reason. And I welcome the consortium. Indeed, I participated in the press conference announcing it. And how much money is the industry putting into this consortium?

Mr. GANTS. The seed money for overhead started at $1 million.

Senator GORE. The entire appliance industry has put $1 million into this?

Mr. GANTS. No, sir. I said, the seed money for overhead, each individual project is separately funded.

Senator GORE. Okay. And how many of those are underway?

Mr. GANTS. Well, I believe there are projects researching 11 different potential substitutes, including substitutes for foam. And these are separately funded.

Senator GORE. Okay. So these are the proprietary efforts by each company to find substitutes?

Mr. GANTS. No, these are the joint efforts by the EPA, the DOE and the industry.

Senator GORE. All right, fine. Well, I welcome that and I participated in the announcement of it. And I am glad to know that that $1 million is only the seed money. Because I think the problem is so massive that we really need an all-out effort.

But you see, even with that effort, the chemicals that are being put into commerce today are going to persist for 100 years or more after their release into the environment. So a refrigerator made today that does not leak, but is then disposed of, and then whether it is five years, 10 years, 15 years or a longer period of time after that, begins to leak, will do damage to the environment for more than 100 years after the time that it begins to leak.

Now if it becomes more possible to reclaim and recapture the CFCs in refrigerators at the time of their disposal or at the time their useful life has ended, it seems to me that people ought to be on notice that the appliance they have there contains chemicals that need to be handled carefully.

And with the consumer information programs that are going to be getting underway, I think that the combination of consumer awareness and the label that we are talking about here would be very effective.

Now I think the recycling mandates and the ban on specific products represent extremely important parts of the legislation as well.

But let me ask you, several of you mentioned state regulation of CFCs and indicated that you would prefer a uniform federal scheme of regulation. I assume that all of you recognize that states like Vermont and other states, perhaps California, Hawaii, other states have legislation now under consideration. I mean you are going to get a crazy quilt patchwork of regulations and measures that will drive you nuts if you do not have a federal law. Is that not right?

Mr. GANTS. Mr. Chairman, if I may respond to that. I would agree with that. We are members of the Alliance for Responsible CFC Policy. The alliance has petitioned the EPA to exercise its mandate under the Clean Air Act to supersede state regulation in this regard.

You are absolutely right, balkanizing the marketplace with different regulatory schemes is not appropriate.

Senator GORE. Well, do you think the EPA will be easier on you than this legislation?

Mr. GANTS. Probably not.

Senator GORE. So you want tougher measures than this legislation?

Mr. GANTS. I think that federal preemption is vitally important.

Senator GORE. But I am not clear what you are saying.

Mr. GANTS. You were talking about state regulatory issues.

Senator GORE. I understand. And that is why you want the EPA to act. And yet you have reservations about the legislation, but you want EPA to act, and I can only assume that is because you think the EPA measures would be much easier to comply with.

Mr. GANTS. No, sir. I think that is a wrong assumption. It is not clear to me you have federal preemption here. If you do, then I applaud it.

Senator GORE. All right, very good. Well, we will certainly consider that in the mark-up.

Now, what percentage of CFC use by the appliance industry involves insulation foam?

Mr. GANTS. I can supply the answer to that for the record to be more accurate, but we use approximately two pounds per refrigerator of CFC–11, with approximately 8 million refrigerators a year being produced. Whereas we only use approximately 6 ounces of the CFC–12.

Senator GORE. Of course the break down in leakage is different for the two substances as well. The gaseous form is highly vulnerable to leakage. Are you working on recycling the foam? You say that you know of no acceptable way to recycle it. Is your industry working on that particular recycling problem?

Mr. GANTS. Yes, Mr. Chairman, we are. In fact we have a task force on recapture and recycling, and we are looking at the myriad of problems involved, and we hope to come up with answers.

We would like very much to get out of using both products as soon as possible. Perhaps the best promise for solving the problem is to find substitutes that are environmentally benign.

Senator GORE. Mr. Wilder, we have had an opportunity to talk before, have we not?

Mr. WILDER. Yes, sir, we have.

Senator GORE. Now, you are from close to my part of the country, are you not?

Mr. WILDER. Well, I am in Lexington, Kentucky, right now.

Senator GORE. You are based in Kentucky?

Mr. WILDER. Igloo was formerly a Tennessee corporation until we were acquired by Valvoline Oil/Ashland.

Senator GORE. Your position is, basically you support the Montreal Protocol approach. Is that fair?

Mr. WILDER. Our position is very much that we support the protocol and a phase-out of CFCs.

Senator GORE. Were you able to see that graph there? Maybe the staff could turn that toward the panel, there. Just turn it around so that the panel and the folks behind them can see it. On the left-hand side is what the present concentration of chlorine coming mostly from CFCs and related compounds is in the atmosphere, roughly three parts per million.

The ozone hole being created above Antarctica, essentially above the North Pole, and the thinning of the ozone layer in all latitudes is being caused by concentrations at the level of three parts per million.

You will see that the Montreal Protocol, if it is fully complied with—and there are some hold-outs still, there are some loop-holes in it and so forth—but if it is fully complied with, the Montreal Protocol will produce a tripling of the present concentrations.

The environmental damage from that is incalculable, and phase-out of CFCs, if that is the only thing that is done, as you will see leads to a doubling of the present concentration in the atmosphere.

As we talked in my office some time ago, Mr. Wilder, I told you that it is really hard for the political system we have to deal with an issue like this, because the damage that is done from our present pattern of activities is almost unimaginable, and the consequences are worse for our children and grandchildren and great-grandchildren, and yet the short-term difficulty in dealing with bans and limitations on the activities producing this problem seem terrible by the time of the next election.

So when you put those two things on the balance scale, discomfort in the next election on one side and unprecedented catastrophe for the environment for our children and grandchildren, it sometimes seems like the right choice to pick the path that avoids difficulty in the next election, and I had—you do not make noise horns, do you?

Mr. WILDER. No, sir.

Senator GORE. I had the manufacturer of noise horns in my office arguing that this is an essential use, to have that racket at a football game, compared to—or even if, it causes this or contributes to this unprecedented catastrophe.

Now, where do we draw the line? It seems to me that we have got to start with the least essential uses, and we have got to develop ways to stop the leakage and to cut off the introduction of these chemicals into the environment and really get on with it quickly, because what we do now continues to harm the environment for more than 100 years into the future.

Well, you know what my views are, and I guess the point I was trying to make when I started that comment was that it is not enough to support the Montreal Protocol and triple the severity of the problem we now have, and it is not enough to double the severity of the problem we now have.

We would like to reduce the problem we now have, and the only way we can do it is on an international basis, which in turn means the United States has got to exercise moral leadership and gain moral authority by facing up to the politically difficult choices that we have to make in our country to stop contributing so much to the problem.

We have got 4 percent of the world's population and we are responsible for more than a third of the world's environmental problem, and here we up and condemn Brazil for burning down the Amazon, which I believe is appropriate for us to do, but how can we do it if we are not willing to face up to problems like noise horns and uses of CFCs and halon in ways that unnecessarily damage the earth's environment.

You have been itching to respond there, so please go ahead.

Mr. WILDER. I just want to make it very clear that I do not think there is a disagreement with my association and my company with your position.

I think I need to make it clear we do support the protocol. We support efforts to strengthen the protocol. We support the idea that based upon scientific knowledge, as Dr. Watson presents, the protocol might need to evolve and change.

Relative to our position on HCFCs, what we are saying is, we want to be sure that we recognize that HCFCs do offer a transitional opportunity for blends. Dr. Watson's position of eventual phaseout of HCFCs is something that we would be very much in favor of, but we just want to make sure that HCFCs are seen as an interim transitional solution.

Senator GORE. OK, all right. Now——

Mr. STOFFLET. If I just may add one comment. We, the automobile industry, are as concerned about CFCs as you are, but the other point that we all need to keep in mind, everybody wants to go faster and faster, and our only concern that you keep focused on is that there are toxicity tests that are going on that will not be completed until 1992 and if we press that button to put out 15 million cars, if the domestic industry does that before those tests are done, while everything looks good, we could have a problem there too.

Senator GORE. There are risks whichever direction we take, and I am convinced that the worst risk before us is the risk of continuing what we are doing right now.

Let me come back to you, Mr. Gants, but I wanted to follow up with Mr. Stofflet. I wanted to thank you for the MVMA's position here fully supporting recycling and reclaiming, particularly CFC-12, and I appreciate your general support.

Let me address the two areas of clarification that you pointed out in your testimony that you think are needed. First, the on-site, off-site business, I tried to clarify that earlier. Let me just say that we will take care of that concern. I believe that is a valid comment and a clarification is in order.

Second, you call for some clarifications in the labeling requirements where multiple labels on the same overall product might be required. You say, what is the problem with—what is the problem with a single label on a product, a car that says, that contains the ozone depleting chemicals?

Mr. STOFFLET. What we are saying, sir, is that in a vehicle we would have different types of labels because it either contains it, it is manufactured by a process, or it contains one of the chemical compounds, and for instance, today we are getting out of foam-blowing for seats, but it does contain CFC-11.

Senator GORE. But you are saying one label would be sufficient? You would not be opposed to——

Mr. Stofflet. It could be a cardboard decal on the card in the showroom, or a label, whatever. We are just saying that a label on each and every part that uses CFCs in today's market, you might have labels all over the car.

Senator GORE. OK. Well, a thing like that can well be handled in the report language. We will work with you on that. I do not think that that needs to be a problem.

Now, third, you say that sections 10(a) and (b) should be modified to conform to the Priority Substance List included in the Montreal Protocol.

Let me just say that you can see on the graph, there, the importance of carbon tetrachloride to this problem, and see what a difference it makes between the second to the top line and the one that is lowered when carbon tet is included. Carbon tet is not included in the Montreal Protocol.

I think there is general agreement in the scientific community and the environmental community that the list compiled in Montreal is incomplete and needs to be supplemented by other substances. I do not think there is much disagreement about that in the community that has really been working on this problem.

Do you disagree with that? What are you getting at, there?

Mr. STOFFLET. No, sir, I do not disagree with that. I am just saying that I have been part of the Montreal Protocol at most of the meetings. All that I am saying is, we have got legislation that is coming out of the various states. Each and every one is picking and choosing compounds.

I thought if you keep it at that, the Montreal Protocol will be revised in June of next year and it probably will contain the ones that you are talking about. That is why the industry, the auto industry, has stayed away from methyl chloroform and carbon tet.

Senator GORE. If we simply added methyl chloroform and carbon tet to the Montreal list, you would not object to that, would you?

Mr. STOFFLET. No, sir.

Senator GORE. All right. We will work with you on that, because I do not think that needs to be a hangup either.

We could continue the questioning process here, but we are going to have a vote on the HHS conference report coming up shortly and I want to thank all of you on behalf of Chairman Bryan and the other members of the Subcommittee. We will continue to communicate with you in this.

Mr. Gants, did I cut you off a moment ago? You might have had something to add. I apologize. I almost forgot.

Mr. **Gants**. I will make it very brief, Senator.

First of all, I want you to understand that we applaud you for your leadership in this area. It is a very vital concern that we have.

We are as interested in protecting the environment as the next guy is, but I want to also emphasize the fact that we are talking about a synergistic problem here. One of the things missing from this very excellent chart here, with which we do not disagree—we do not disagree with the chart is the effect of CO_2 emissions.

Senator **Gore**. Right.

Mr. **Gants**. What happens if you stop using CFCs and HCFCs and you have to increase CO_2 emissions? I think that that needs to be added and brought into the equation.

Senator **Gore**. I think that is a valid point, and I agree with it because the global warming problem is the most serious environmental problem we face, and some of the comments of Senator Ford earlier are ones that I agree with, when he and the witnesses of the first panel pointed out that we certainly need to think of these problems in tandem and not make one of them worse when we are trying to solve the other one, that the CFCs are particular culprits in that regard, because they are unique in that—and halons are the same way—in that CFCs and halons not only contribute almost all of the destruction of the stratospheric ozone layer, they also represent about 20 percent of the global warming problem.

Some of the CFCs have 20,000 times per molecule the global warming potential as a molecule of CO_2 and so, if you substitute a few more molecules of CO_2 for the removal of a few molecules of CFCs, you are way ahead on the global warming problem as well as on the stratospheric ozone depletion problem.

But those are calculations which cannot be done on the back of an envelope here at the dias. They have to be looked at very carefully, and I think it is quite appropriate for you to point out that we need to consider these problems in tandem and we will certainly be prepared to do that.

One final comment before I adjourn the hearing. I recognize, and I am sure every member of the Subcommittee feels the same way, that the industries represented here are made up of people of goodwill who share concerns about the environment and want to play a constructive role.

They have employees whose livelihoods may be affected by precipitous action. They have concerns that are quite apart from the global environment that they quite properly continue to address vigorously and we respect that.

But this problem, which has such a long duration and is so unprecedented and is so difficult to confront, drives us towards actions that in another context might never be considered.

We appreciate your contribution to this process very much and the hearing, with that, will stand adjourned.

[Whereupon, at 12:47 p.m., the hearing was adjourned.]

ADDITIONAL ARTICLES, LETTERS, AND STATEMENTS

STATEMENT OF THE CONSUMER PRODUCT SAFETY COMMISSION

The staff of the Consumer Product Safety Commission appreciates the opportunity to comment for the record on S. 870, a bill designed in part "to label consumer products containing substances that contribute to the depletion of the ozone layer in the upper atmosphere. . . . " These comments are limited to the labeling provisions of the bill, primarily as found in section 8.

To enforce such labeling the Commission would, in the staff's view, need either additional resources or the responsibility assigned to the Department of Commerce to determine exactly which brands of products are required to be labeled. The Commission already enforces a similar labeling requirement for self-pressurized consumer products containing chlorofluorocarbons (CFCs), which was issued in 1977 under the Consumer Product Safety Act (15 U.S.C. §§ 2051–2083), and which became effective on February 20, 1978. This labeling requirement, codified at 16 C.F.R. § 1401, while much narrower in scope than that in the current bill, contains similar language: "WARNING—Contains a chlorofluorocarbon that may harm the public health and environment by reducing ozone in the upper atmosphere."

In addition, the staff has the following technical comments and suggestions:

1. *Appropriateness of statute.*—Section 8(d) of the bill would consider a product not in compliance with the labeling requirement to be a misbranded hazardous substance under the Federal Hazardous Substances Act (FHSA). Since the FHSA currently deals with product toxicity risks, rather than with risks associated with a product, such as those dealt with in the bill, it might be more appropriate to enforce labeling under the Consumer Product Safety Act (CPSA) instead of the FHSA. Using the CPSA would also be consistent with the use of the term "consumer product" in the bill, since this term is used in the CPSA but not in the FHSA. Also, as mentioned above, the Commission's present labeling rule for chlorofluorocarbons is under the CPSA. A change to the CPSA could be made by amending the present section 8(d) to delete all of the language starting with the words "a misbranded" on line 11 to the end of the subsection on line 16 of page 9 and replacing it with the language "not in conformance with a consumer product safety standard under the Consumer Product Safety Act (15 U.S.C. 2051 et seq.)." In addition, section 8(b) of the bill should be amended by adding to the end thereof the following language: "The requirements of this section and any regulations issued or referenced thereunder shall be deemed to be a consumer product safety standard, as described in the Consumer Product Safety Act at 15 U.S.C. § 2056(a)(2)." This would make violations subject to the prohibited act (15 U.S.C. § 2068) and penalty provisions (15 U.S.C. § 2069, 2070) of the Consumer Product Safety Act.

2. *Regulations.*—Section 8(c) would require the Commission to issue implementing regulations within 3 months of the date of enactment of the bill. It is not entirely clear whether these regulations are intended to deal solely with prominence of the label or whether they are to be substantive as well. Assuming that they are intended to deal solely with prominence, the staff believes that the present regulations of the Commission under the FHSA that set forth in great detail requirements for the placement, conspicuousness, and contrast of warning labels (16 C.F.R. § 1500.121) would also adequately serve the purpose of detailing prominence requirements for the labeling under this bill. Therefore, instead of requiring the Commission to issue new regulations for prominence, the staff suggests that the bill simply refer to the existing regulations. This could be accomplished by deleting subsection 8(c), redesignating 8(d) as 8(c), deleting the words "under subsection (c) on line 20 of page 7, section 8(a) of the bill," and replacing that with the language "at 16 C.F.R. § 1500.121". These changes would also eliminate the potential problem of prescribing procedures and findings for the regulations to be issued and the problem that three months may be far too short a period of time for the Commission to issue such regulations.

3. *Scope of labeling requirement.*—The first issue we see under this topic involves the definition of the term "consumer product." In this regard, we note that section 4

of the bill containing definitions does not define the term "consumer products." Instead, it defines, in subsection (5), the term "commerce products" to mean "consumer products offered for sale at the wholesale or retail level." Absent additional language, the definition of a consumer product in the CPSA at 15 U.S.C. § 2052 would control. In general, this would include products sold to, or used by consumers in or around a residence or school, in recreation, or otherwise. It would not include products sold for industrial or commercial purposes, and it would not include food; drugs; medical devices; cosmetics; pesticides; motor vehicle, boat, tobacco, or aircraft products; or firearms or ammunition. Therefore, if the definition is intended to be so limited, relying upon the definition of consumer product as it appears in the CPSA would be appropriate. If not, the definition should be clarified to the extent possible. (We note that relying upon the definition of consumer product under the Consumer Product Safety Act would eliminate coverage of CFC boat horns and automobile air conditioning products; the Federal Hazardous Substances Act would not exclude those products.)

A second, but equally important, issue under this topic concerns the determination of exactly what products need to be labeled. Even with the Secretary of Commerce, pursuant to section 10 of the bill, listing the substances to be regulated, it would take a substantial effort for the Commission to determine every product which "contains, is produced with, or is produced from a substance listed under section 10 of this Act." In addition, it is possible that a substance listed might be used in the production of a consumer product in a manner that prevents an ozone-depleting substance from actually being released. Therefore, the Commission staff believes that the feasibility of enforcing a labeling requirement depends upon resolution of the issue of determining exactly what products are covered. The staff suggests that the Department of Commerce, with far greater resources than the Commission, be directed to list the specific products to be labeled as well as the chemical substances. This listing of products should be by brand, name of manufacturer or importer, and address.

STATEMENT OF THE ASSOCIATION OF FACTORY SEALED FIRE EXTINGUISHER MANUFACTURERS, INC.

The following is a summary of relevant points with respect to the current market for domestic halogenated fire extinguishers.

At the 1986 consumption levels for CFC's and halons, the domestic extinguisher market accounted for just 0.3% of total ozone depletion potential for that year.

The industry's trade association, Association of Factory Sealed Fire Extinghisher Manufacturers, Inc. (AFSFEM) is in regular contact with the EPA and a copy of the association's response is attached.

All members of AFSFEM (Which represents 95% of the total domestic halon extinguisher market) have developed and installed return and recovery procedures for their products. Shortly, AFSFEM members will have over 150 US locations to serve as collection points for units manufactured by any AFSFEM member. The introduction of appropriate financial incentive for owners to return the units at the end of the guarantee period is being investigated and developed.

AFSFEM members, both collectively and individually, are actively pursuing alternative agents. Tests have already been conducted at Underwriters Laboratories on a potential replacement for Halon 1301 and additional tests are scheduled for mid-June. Much of this work is being done with the cooperation of major halon producers.

Clean agent extinguishants are needed for the home. The amount of high-valued electronics in homes have increased dramatically in the last decade. In 1988 U.S. consumers purchased over $25 billion of consumer electronics (Source: Electronics Magazine). Future projections indicate substantial increases. Currently, approximately 15% of U.S. homes have personal computers, industry experts predict that number to triple in the next ten years. Fire extingishing industry experts recommend clean agents in such applications. Dry powder, when discharged in an area can and has been proven to cause irreparable damage to such articles even if the articles damaged are not the source of the fire. The damaging effect of the powder agents can be carried throughout the structure by normal heating/cooling/ventilation systems.

There are no current alternatives for clean halon agents for the home. Authorities such as NFPA recognize only halon and carbon dioxide (CO_2) as clean agents. However, because of CO_2 extinguisher's physical characteristics, they cannot be considered as an alternative for the domestic market. Similarly rated CO_2 units weigh in excess of 15# and are five to seven times as expensive as halon units. These facts would make them too bulky and costly to be used by American consumers for their homes.

Since implementation of the Montreal Protocol in 1986, all member companies of the AFSFEM have taken significant positive steps in addressing ozone depletion. The organization is comprised exclusively of small businesses whose future depends solely on the consumer extinguisher market. It would be impossible for the member companies to survive a non-sales research and development period while halon suppliers and larger halon related companies develop suitable alternatives. As an association, AFSFEM believes it is imperative a fair amount of time be allotted to our industry to continue development of suitable extinguishing agents.

STATEMENT OF WHIRLPOOL CORPORATION

Whirlpool Corporation is the world's largest manufacturer of major home appliances and, as a producer of refrigerators, refrigerator-freezers and room air conditioners, is quite concerned about certain provisions of S. 870, the Consumer Ozone Protection Act

Refrigerators and freezers use CFC–12 (refrigerant) and CFC–11 (insulation) and although the home appliance industry uses about 4 percent of free world CFCs, we fully endorse the phaseout of these CFCs as soon as energy-efficient, safe and reliable alternatives are commercially available.

We are committed and active in finding solutions in all aspects, including: The search for substitutes; minimal escape during manufacturing; and full recovery during service.

Labeling

There is no need to add another label to these appliances. Serial plates already contain CFC information; and, since there are no alternatives for CFCs in the market today, a label does not offer comparative shopping benefits to consumers.

HCFCs

HCFCs, especially, HCFC–22, should not be eliminated now because they are vital to the solution at this time. HCFC–22 has a very low ozone depletion factor and may (in combination with other HCFCs) provide the best alternative—until a more permanent one can be found.

WHIRLPOOL DEVELOPS PROCESS TO CAPTURE CFC DURING REFRIGERATOR REPAIR

Whirlpool Corp. has discovered and developed a process to recover chlorofluorocarbons (CFCs) previously lost to the atmosphere during repair of refrigerators and freezers. New evidence collected in the last few years confirms that the ozone layer that encircles the earth and screens out most damaging ultraviolet rays of the sun is being depleted slowly by CFCs.

The Whirlpool CFC recovery process was developed by John A. Nelson, staff engineer, and Terry L. McGath, group product manager, consumer services education. In the past, CFCs in refrigerators and freezers were discharged into the atmosphere because there was no method to capture them. Using the new, simple process, however, a specially designed seven-layer plastic bag catches and holds refrigerants released during servicing. Following servicing, the service technician takes the old refrigerant to a recovery center where it is transferred from the plastic bag to a pressurized tank and held for recycling.

According to Walter J. Coleman, vice president, consumer services, Whirlpool believes it's the first major U.S. appliance manufacturer to successfully develop a relatively simple process to capture used refrigerant at the time of refrigerator or freezer repair in the home.

"We see this process as a small but important step toward eventual elimination of all CFC use in appliance manufacture," Coleman said. "We've also found that consumers like the new process because it's quick, it's clean and we aren't dragging heavy equipment into their homes. And they're delighted that repair of their refrigerator or freezer isn't going to damage the earth's atmosphere."

Service technicians have gained an advantage, too. One side of the plastic bag has been left clear so the technicians can visually check exhausted refrigerant. This helps them determine the degree of damage that has been done to the appliance's sealed system.

The multi-layer bag has a 28 oz. capacity which permits it to be used for two or three repair jobs before being emptied. The plastic material is durable enough to be filled and emptied up to four times before being cut up and discarded along with other plastic waste.

The recovery process is already in use at several Whirlpool factory service centers and will be in all factory owned servicing operations within the next 30 days. Whirlpool anticipates that by next spring the process will be available to all 6,500 service companies authorized to do warranty repair work for the company, following necessary training for technicians and placement of recovery stations.

While a market exists for the used refrigerant, Whirlpool will hold on to what it collects, at least for now. "There may be an opportunity to reuse it right here within the company," Coleman said.

After its introduction to Whirlpool authorized servicing centers in 1990, the recovery system will be available for use in servicing all KitchenAid, Whirlpool and Roper brand appliances.

Whirlpool Corporation is the world's leading manufacturer and marketer of major home appliances. Company headquarters are in Benton Harbor, Mich.

FACT SHEET—WHIRLPOOL CORPORATION CFC-12 RECOVERY BAG

Whirlpool Corp. has developed a specialized plastic bag to use in capturing refrigerants containing chlorofluorocarbons (CFCs) when service is required on the sealed system of a refrigerator or freezer. The bag was developed at the company's research and engineering center in Benton Harbor, Mich., and is designed to capture R-12, the type of CFC used in refrigerators and freezers. Chief characteristics of the bag include:

Tough and durable. The seven-layer plastic is highly puncture resistant.

Light and easy to transport. It comes folded in a small cardboard box. When opened, it measures 3 feet x 4 feet.

Reusable. It has a 28 oz. capacity that allows refrigerants from as many as three appliances to be captured in the bag before it must be emptied. The bag may be filled and emptied up to four times before being discarded.

Easily disposed of without contamination. Bags will be cut up to prevent their reuse in an inappropriate manner and then discarded with other waste plastics.

Inexpensive. It does not require a large initial investment by the servicing dealer or repair shop.

Easy and quick to use. Little or no additional time is required in the consumer's home during the repair process and the very simplicity of the operation will encourage service technicians to use them.

Clean and neat. There is no mess and no heavy equipment must be dragged through a consumer's home.

Capturing the used refrigerant in the CFC recovery bag while in a customer's home is only the first step in the recovery process. After it is full, the bag is taken to a recovery center, usually the service center repair shop, where the refrigerant is pumped into a pressurized tank and saved for recycling.

Patents are pending.

Air Conditioning Contractors of America

Quality
Contractors
Building a
Quality Industry

October 19, 1989

The Honorable Richard H. Bryan
Chairman
Consumer Subcommittee of the Commerce, Science
and Transportation Committee
SH-227 Hart Senate Office Building
Washington, D.C. 20510

Dear Chairman Bryan:

The Air Conditioning Contractors of America (ACCA) appreciates the opportunity to submit written testimony for the Subcommittee's October 19, 1989 hearing concerning S. 870, the Consumer Ozone Protection Act of 1989.

ACCA is a trade association composed of over 2,800 heating, ventilation and air conditioning contractors nationwide. Its members install and service commercial and residential air conditioning and refrigeration systems.

While S. 870 specifically requires the recovery and recycling of refrigerant during the servicing of mobile air conditioners, ACCA is concerned about the possible extension of regulations to the air conditioning and refrigeration industry. Therefore, we ask that the following comments be submitted for inclusion in the formal hearing record on S. 870.

Introduction

Before scientists discovered that chlorofluorocarbons (CFCs) were contributing to the depletion of the earth's protective stratospheric ozone layer, it became common practice for a service technician, when servicing an air conditioning unit, to simply release the chemicals to the atmosphere. With restrictions already in place to phase-out harmful CFCs, recycling is seen by many as a way to protect the ozone layer as well as make up for the lack of available CFCs.

ACCA is in favor of recovering and recycling CFCs, however we feel that the air conditioning and refrigeration industry is not ready for mandated recycling at the present time.

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ACCA is presently working with several industry groups and the Environmental Protection Agency (EPA) to advance the technology and methods of recovery and recycling in order to prevent the release of these harmful chemicals during the servicing of air conditioning and refrigeration systems.

Equipment Availability and Limitations

One of the major dilemmas that contractors will face is equipment availability. The best available information indicates that there are only only 15 companies currently producing refrigerant recovery and/or recycling equipment in the United States (see Appendix A). Of these, only five have products patented and only three have been in the U.S. market for more than one year. Seven producers of the equipment expect to introduce their products by late 1989 or early 1990.

Nationwide sales of recovery/recycling equipment in 1988 totaled only 600 units. If recovery and recycling of refrigerant is mandated by law, the demand for equipment in the air conditioning industry alone is expected to reach upwards of 325,000 units. Close to one quarter of a million units will be needed for the U.S. automobile industry in addition to increasing exports to foreign countries. The market will undoubtedly experience tremendous growth problems and contractors will face a shortage of recovery/recycling equipment.

The equipment that is currently available has several limitations. Eleven of the companies claim to have equipment that can recycle CFC-12, CFC-500, CFC-502 and HCFC-22. Equipment for recycling CFC-11, CFC-113 and CFC-114 is in the early stages of development. The second limitation concerns the weight of the equipment. The equipment being produced is very cumbersome, ranging from 40 to 600 pounds in weight and averaging close to 150 pounds. It would be extremely difficult for one service technician to carry most of the models currently available to a roof unit in order to recover refrigerant. Building owners will end up paying for two technicians instead of one to do the job.

Processing time is also a problem. On the average, the equipment is capable of recycling three pounds of refrigerant per minute. This figure does not include the time needed to recover it. When large amounts of refrigerant are recovered the time that it takes for a technician to recycle it will be cost prohibitive due to higher labor costs, not to mention the cost of the recycling equipment. A contractor can be expected to pay on the average, at least $5,000 for each recycling unit, depending on the model.

One of the HVAC industry's biggest concerns is the lack of standards for recycling equipment or for the purity of recycled refrigerant. Many contractors as well as manufacturers question the equipments' reliability in this regard. Presently, there is no standard for on-site recycling. The Air Conditioning and Refrigeration Institute has written Standard 700-88 which covers off-site recycling. Nonetheless, very few recycling equipment manufacturers have been able to meet the standard due to its oil specification. The risk of damaging expensive air conditioning equipment makes using recycled, possibly contaminated, refrigerant a huge gamble.

There is also a question as to whether the air conditioning equipment manufacturers will extend their product warranties to allow the use of recycled refrigerant. In addition, equipment needed to adequately measure the level of contaminants in recycled refrigerant requires an experienced operator and costs between $35,000 and $100,000.

Off-site Recycling and Storage Containers

Due to the problems discussed above with on-site recycling, contractors may opt to recover used refrigerant and transport it to an off-site recycling facility. Currently, there are only three known facilities in the United States: Omega Recovery Systems located in Whittier, California, DAVCO Manufacturing in Easton, Pennsylvania, and Refrigerant Recovery Systems in Friendswood, Texas. Two additional facilities -- one to be operated by DuPont and the other by National Refrigerants, Inc. -- are in the planning stage.

The service technician faces an additional dilemma in recovering refrigerant and transporting it to an off-site facility -- a lack of available containers in which to store refrigerant. It is illegal and dangerous to refill disposable refrigerant cylinders. Manufacturers do sell refrigerant in returnable cylinders, however these cylinders are only approved by the Department of Transportation (DOT) for refilling by the cylinder owner, which in most cases is the refrigerant manufacturer, not the contractor.

The industry needs recovery containers that are safe for use by service technicians. Filling compressed gas cylinders is not something to take lightly and requires training. It is very difficult to calculate safe-fill levels for cylinders containing used refrigerant and oil, because it is difficult to determine the percentage of oil content. Refrigerant oil is less dense than refrigerant, so relying on safe-fill weights based on refrigerant alone can be dangerous.

On July 28, 1989, the Environmental Protection Agency issued a clarification in the Federal Register stating that used refrigerant previously classified as a hazardous waste under the Resource Conservation and Recovery Act was not a hazardous waste. This reversal was a giant step forward in efforts toward recovery and recycling. While many states have now adopted this classification, others such as Illinois, New Hampshire, Oregon and Wisconsin follow much stricter laws. In these states contractors as well as owners of recycling centers will have to obtain a hazardous waste permit in order to recover and recycle refrigerant.

Conclusion

While the situation is not hopeless, there is still a great deal of work to be done. The industry needs time to develop standards for producing reliable equipment and procedures and to educate its technicians. Panels of industry leaders have been organized to proceed with these tasks. By mandating recovery and recycling in the air conditioning and refrigeration industry prematurely, contractors will be forced to purchase and use costly and unproven equipment and send untrained technicians into the field.

Sincerely,

James P. Norris

James P. Norris
Executive Vice President

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